Chemical Production Estimates for 1943
page 656

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New Chemicals for Industry
page 693

November 1943

Chemical Industries

The Chemical Business Magazine


Communications Need Alkalie
PAPER
BATTERIES
RADIO TUBES
PLASTICS
Practically every type of communicatio
by which modern warfare is directed—from
office memo to walkie-talkie—is directly or in-
directly dependent on alkalies and related prod-
ucts . . . indicating once again, in war as in peace,
alkalies are indispensable!
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Chemical Industries

THE BUSINESS MAGAZINE for MAKERS and USERS of CHEMICALS

Management • Research • Production • Marketing

VOL. 53 — NO. ~~5~~ 6

November, 1943 *Contents*

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THE READER WRITES

Foreign Literature

To the Editor of Chemical Industries:

The letter in the September issue of CHEMICAL INDUSTRIES from Dr. Harold F. Cotter of the University of Alabama is of great interest to workers in chemical literature. Certain government offices in Washington are responsible for the obtaining of German and Italian publications, and these are generally made available to the scientific public via the Library of Congress, Microfilm Division.

Russian periodicals are less generally available, but in some cases they may be obtained through Voks, the Russian society for cultural relations with foreign scientific societies, a representative of which is located in the Russian Embassy.

T. E. R. SINGER
Literature Consultant
New York, N. Y.

To the Editor of Chemical Industries:

Perhaps the following which appeared in the October 2, 1943, issue of the *Journal of the American Medical Association* under the title "Filling the Gaps in Medical Libraries After the War" will be useful relative to the inquiry of Professor Cotter on page 292 of the September issue of CHEMICAL INDUSTRIES:

"In a letter to the *Times* C. C. Barnard, librarian of the London School of Hygiene and Tropical Medicine, describes the position of learned and scientific libraries as faced with the problem of attempting to fill gaps in their sets of periodicals due to the war. As stocks in European countries may also have suffered there may not be sufficient copies to go around. To prevent an unseemly scramble by the libraries for the available copies it is desirable that a representative and impartial body should decide, on a national scale, to which institutions the available copies should be allotted. This allocation should form part of a much larger scheme whereby the present holdings of learned periodicals in all libraries would be surveyed and, where necessary, redistributed in the interest of research. The obvious body to do this is the Library Association, though the actual work might be most economically done at the National Central Library. Not until this task is completed will it be possible to compile a satisfactory union catalogue of periodicals in British libraries."

PHILIP D. ADAMS
Andrew Jergens Co., Cincinnati, O.

For More Statistics

To the Editor of Chemical Industries:

Business is being severely handicapped and the country done a great disservice by the refusal of government to release the statistics so necessary to sound and efficient planning. In 1941 and 1942 the figures on production, consumption, and stocks on hand for many commodities—such as copper, aluminum, a number of synthetics, many items in the chemical field, as well as numerous others essential to industry—were quite properly held back because they could "give aid and comfort to the enemy."

With the day of "on hand and on order" past, and with our production at record levels and still rising, this need for secrecy is gone. What possible figure of ours, on any commodity, could fail to make similar figures of our enemy pale into insignificance?

Planning for the future, now, is imperative—and this does not, by any means, infer that it will be done at the expense of war needs. All of the reliable business statistics that were available prior to the war should be released promptly to aid in this planning. To plan intelligently requires trustworthy statistical information. Unreliable data means catch-as-catch-can planning, added costs, production loss, and a shameful waste of manpower.

I submit that businessmen (the specialists in each line) with all the facts before them, can better determine the necessities of the day than any small group of office holders sitting in Washington. I am afraid the principal motivating influence behind the secrecy on statistics is to retain power and continuity of office—the withholding of facts certainly is an aid to this end.

To my own knowledge some items are already more than sufficient to meet the war needs, and there are undoubtedly others, yet as recently as July 17th, Mr. J. A. Krug, Program Vice-Chairman, War Production Board, wrote to Mr. John F. Fennelly, Executive Director, Committee for Economic Development, Department of Commerce Bldg., Washington, D. C., that—

> **"The materials situation is still so critical that the War Production Board finds it impossible to allocate even small quantities of material for the development of postwar products. As you know it has been impossible to supply all of the materials considered essential for war purposes, and we see no chances for the material situation improving at any time soon."**

Question: Where is the evidence that this blanket denial is justified?

In my opinion it is time this whole situation was ventilated.

This is written to you with the hope of stimulating open and widespread discussion and centering attention on the problem with the ultimate objective of bringing about a reform in Washington policy.

WHIPPLE JACOBS
President
Belden Mfg. Co., Chicago, Ill.

More on Phenol Burns

To the Editor of Chemical Industries:

In the September issue of CHEMICAL INDUSTRIES I noted that you would be glad to hear from anyone who has had experience with the use of camphor in the treatment of phenol burns.

I am not such person, but I do have some experience with the treatment of phenol burns, and my own personal remedy, which I have used repeatedly and with considerable effectiveness and no ill effects, is washing of the affected parts with a solution of bromine in glycerol. It was suggested shortly before I used it (about 1928) by Dr. Frank C. Whitmore and appeared in Vol. I of "Organic Syntheses." From Collective Volume I of "Organic Syntheses," 1932, page 156, I quote:

> "A saturated solution of bromine in glycerol should be kept at hand as an antidote for phenol burns. If all undissolved bromine is allowed to settle out before the solution is used, there is no danger of bromine burns.
>
> "Limewater is also highly recommended for phenol burns."

I tried at one time to have bromine in glycerol introduced at a plant where phenol was continually handled to replace the conventional cans of alcohol which were kept at convenient stations. However, the suggestion did not meet with any response. Anything with bromine in it would possibly frighten one, but bromine in glycerol is not much more dangerous than glycerol and rose water, for the hands, at least, and is a great deal more pleasant for hands seared by phenol.

Relative to the use of camphor in alcohol as a treatment that was suggested in the letter by Melvin de Groote and which is commented upon by Arnold Kirkpatrick, my own reaction is that, as compared with bromine in glycerol, it is less likely to be as effective and to be too slow acting to be of real merit, although I think it might meet with greater possibility of universal use should it prove effective.

F. F. E. KOPECKY
Phillips Petroleum Co.
Bartlesville, Okla.

fightin LEATHER

In every battle area and on the home front too, America's fighting men are wearing chrome-tanned shoes, made of leather that is soft, comfortable and long-lasting. Very large amounts of chromium chemicals are required for the tanning of leather. Not only does chrome tanning produce superior-wearing and more flexible leather than the old tanning methods, but the chrome tanning process is very much faster, which is particularly important to the war effort. Many of the country's foremost tanners know "Mutual" Bichromates to be the best obtainable. Their knowledge of skins and tanning, coupled with the use of the best materials for their treatment, minimizes manufacturing difficulties.

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270 MADISON AVENUE **NEW YORK CITY**

Postwar Industry . Synthetic Rubber . Critical Occupations

Chemical AMGOT . Menthol . Cartels . CMP

Federal Government and Postwar Industry

Unprecedented investment of Federal billions in war plants, research, and actual manufacturing operations, has precipitated a situation with grave implications for private chemical industry as well as other manufactures.

Having in mind possibly the long atrophy of Muscle Shoals and kindred projects of World War I, more extreme elements here are aggressively pushing for a broad government program, key features of which would be federalization of industrial and scientific research, and nationalization of such patents and operation of such facilities as the government could lay claim to by reason of Federal funds expended in the war period or afterward.

The premise of these planners is that "Technology—its directions, its applications, and its enjoyment—is today a primary concern of Government."

The United States Government is today one of the major patent holders of the world. Seized enemy patents undoubtedly will be made available to the public after the war, on a government lease system probably; many developments of the war era in which Federal funds had a share, even by reason of contributions to some scientific institution, probably will be treated in the same way if present plans mature.

On the same principle, the huge investment in war plants by Government has opened the way for application of government controls as to their future use. If any objection is raised, the answer is, "Why not—didn't the government build them?"

The hearings before the Kilgore committee, in which cartels and industrial control of patents have been publicly smeared, may be viewed as laying the groundwork for such a program.

According to Secretary of Commerce Jesse Jones, who is also chairman of the various war subsidy corporations of varied initials (Defense Plant Corporation, etc.) the Reconstruction Finance Corporation has authorized more than $9 billions for construction, equipment or expansion of 1,753 plants making war supplies. These include, among hundreds of others, 84 aluminum plants, 35 for aviation gasoline and related products, 40 magnesium plants, 60 for mining and producing minerals and metal products, 75 ordnance equipment, and 60 for synthetic rubber, chemicals, and materials entering their manufacture.

When the war is over, he feels the government should get out of active industry as rapidly as it can, but without too much unnecessary loss.

One of the most tangible developments of the program is a report that the TVA is making a strong bid for executive handling and distribution of ammonium nitrate for fertilizer. A comprehensive program is understood to be under consideration for utilization of Army ordnance plants for production of this substance. TVA is, in fact, producing phosphorous, superphosphates and ammonium nitrate.

Local groups are reported here and there to be already organizing for purchase of present government-owned plants at pick-up prices. Such schemes are particularly vulnerable to political influences, just as the location of some of these plants undoubtedly was.

Duty Free Rubber?

The post-war fate of the $633 million synthetic rubber industry has been put in doubt once more. It is not clear here why the President raised the question of a tariff, or no tariff, on postwar natural rubber.

The calm reaction, after the first jolt of his remarks that rubber imports should not be handicapped by high tariffs, is that the question probably won't be one for Mr. Roosevelt to answer by himself. Congress must decide.

Industry spokesmen feel also that postwar rubber demand will be such that there will be use for both synthetic and natural products.

Other quarters are inclined to raise the question of how much rubber will be available. The imports from Latin America have not been impressive in relation to the expenditure of Federal money and the effort that has gone into this project. There are defense aspects regarding the size of the expenditure which need to be considered, but even so, Brazilian rubber is costing a very pretty stack of dollars.

Molasses and Rubber

In addition to colliding with a scheme for reviving distillation of alcohol beverages, the synthetic rubber

program now appears to have hit a similar obstacle in the Caribbean, and with less success.

Whereas in this country it was easy to decide that the synthetic rubber program's requirements of industrial alcohol should come first, it appears at this writing as if there might be some difficulty about the matter in Cuba. Efforts are understood to be under way there to persuade Cuban authorities to reverse a decision to utilize huge molasses stocks there for rum, instead of exporting them to this country for use in alcohol manufacture.

WMC Hits Chemical Production

After prolonged debate, the War Manpower Commission has rejected an application by chemical industrial spokesmen to include a comprehensive list of key occupations in their field on the WMC critical list. The result will be a continued loss of skilled personnel to the armed services and to so-called "war industries," ignoring the essential nature of chemical manufacture.

Chemical Production Abroad

By a peculiar oversight, no chemical division appears to have been included in the AMGOT organization which will handle affairs in re-conquered or subjugated areas abroad. Apparently British thought has been ahead of this country's on some phases of practical administration—specifically, the handling of chemical plants, among others, in such countries.

It is conceded that there may be little or no industry left, after bombings and deliberate enemy sabotage, but if there should be plants, undoubtedly they must be operated under Allied supervision.

The point has been made that operation of surviving facilities can ease considerably a present strain, and a future one also, on American resources. It is not generally known, for illustration, that Lend-Lease is taking about 80 per cent of production of triple superphosphate so that there is a domestic shortage.

Plants abroad that can utilize North African phosphate rock and Sicilian sulfur to produce required fertilizer materials naturally would relieve much of this pressure.

Meanwhile, the War Food Administration has advised other agencies concerned that increased production of superphosphate is essential for war use, and some price actions have taken place designed to stimulate domestic output.

Menthol Order Expected

The increasing stringency in the oil of peppermint supply led to a protracted canvass of the situation at a recent industry meeting with agency heads here, as a result of which an order to control menthol supplies appears foregone. Such an order already has been considered in draft form, and may be expected at any time.

Even the plan of certain large industry users of oil of peppermint to utilize their large inventories and save the current market supply has only alleviated the situation, it is said, and has not made it possible to go much further along without government control.

Bill for Registration of Cartel Agreements

Senator O'Mahoney has launched the long-anticipated Washington attack on cartels. His bill, S. 1476, provides for registration of all cartel agreements.

Some significant features attach to its introduction at this time. It aims another barrel at these arrangements, or suspected arrangements, matching the already aimed Kilgore investigation, which started out more as a vehicle for promotion of a Federalized patent administration. Senator O'Mahoney's bill is admittedly in line with suggestions or recommendations made in the past by the TNEC, and later, the National Patent Planning Commission.

It has been referred to the Senate Judiciary Committee for hearing, and there is every advance expectation that these hearings will be very exploratory, and against a very acoustic background designed to make the most of what revelations the hearings produce.

The first authoritative reaction from an industry standpoint is that the bill is drafted on very broad dimensions. Some provisions are so wide, in fact, as to permit almost any interpretation that might be desired. The interpretation of "foreign contracts" required to be registered, for example, would cover every trade transaction or commercial agreement that can be imagined, with very minor exemptions that take nothing from the sweeping character of the major clauses. Processes, patents, trade marks, licenses, and even assignments, are covered.

The Attorney General would receive all reports, and the findings there could be acted on under the anti-trust laws, which in effect, according to some views, are thus extended to the foreign field.

Decentralized CMP

The decentralization of WPB's Controlled Materials Plan, affecting users of copper, steel and aluminum, will involve priority and allotment procedures primarily of manufacturers of Class B products, and only the smaller producers, it is indicated in a clarification of the plan here. The decentralization will introduce no new forms.

The basic premise of the decentralized program is a realization that 10 per cent of CMP applications are for 90 per cent of materials. The great bulk of applicants are seeking a cut of the remaining 10 per cent.

The criterion as to whether a CMP applicant is a "small" user, and hence subject to simplified handling, is the size of allotment requested—carbon steel, up to 150 tons; alloy steel, 40 tons; copper base alloy sheet and strip, 8,000 pounds; copper base alloy rod, bar and wire, 10,000 pounds; copper base alloy tubing and pipe, 5,000 pounds, aluminum in all shapes, 7,000 pounds.

TRADITIONS OF NIAGARA

Magnet for Pioneers

ENGRAVED ON STEEL BY T. S. WOODCOCK, REPRODUCED THROUGH THE COURTESY OF THE NEW YORK PUBLIC LIBRARY

An Essential Part Of America's Great Chemical Enterprise

Like a magnet the Great Falls drew explorers into the untracked forests of the Niagara region. It possessed a fascination for those early pioneers ... men with imagination, vision and a spirit of adventure. And to later Americans it possessed the same fascination, for it offered unlimited possibilities for industrial growth. As a result Niagara is today the center of a vast industrial area ... the powerhouse of an increasing number and variety of business and manufacturing activities.

Of these Niagara Alkali Company is among the oldest and most progressive. With a long record of pioneering achievements in the field of chemicals, Niagara Alkali is today setting a new pace in the production of materials vital to the winning of the war. Never before has the long experience and the advanced knowledge of Niagara's personnel proved its value so conclusively as in the company's present war production record.

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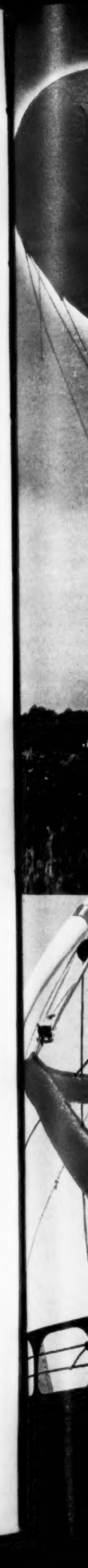
60 EAST 42nd STREET, NEW YORK 17, N. Y.

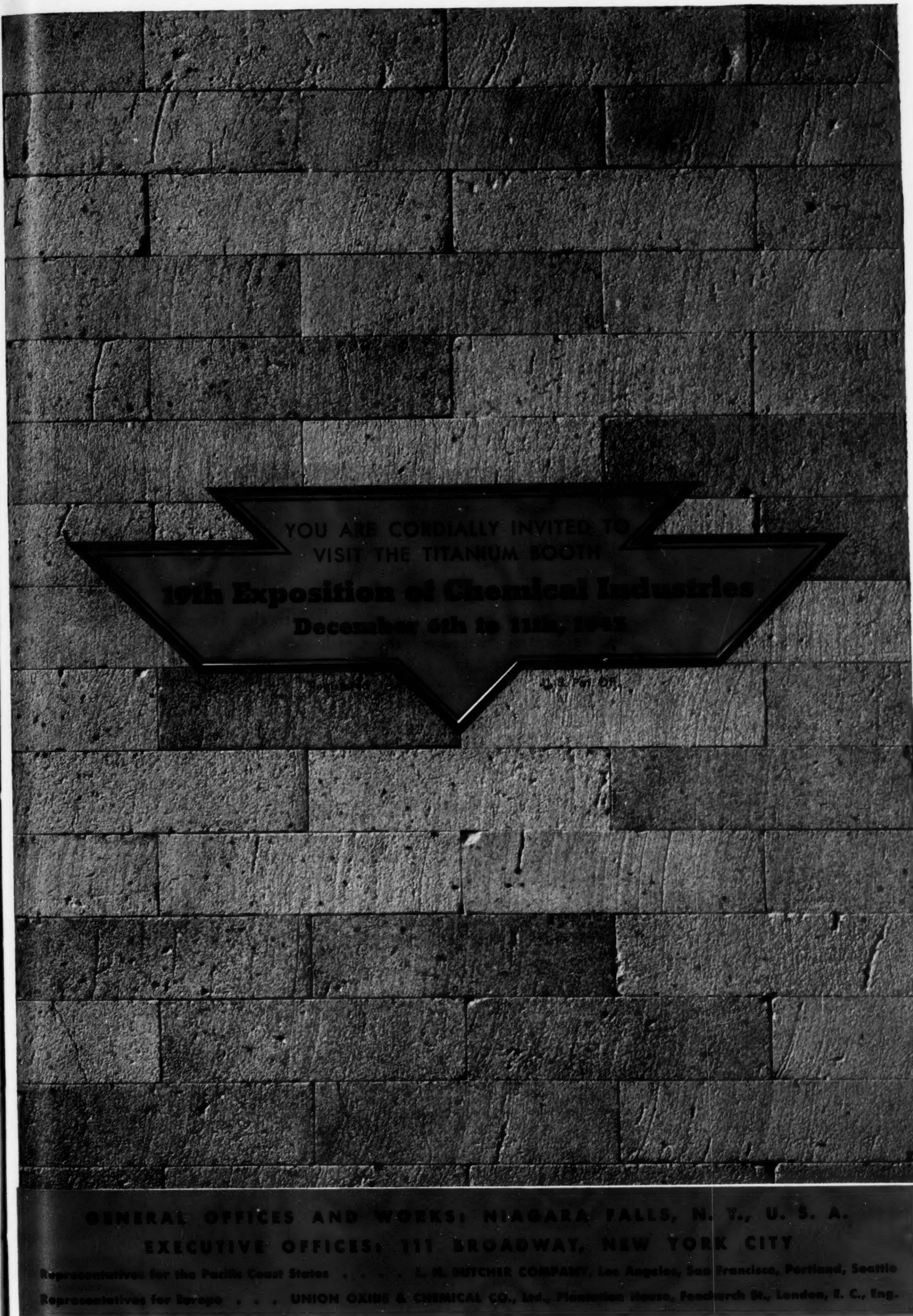


LIFE On The

(*Left*) **A SUCCESSFUL COTTON CROP** was recently harvested at Stamford, Connecticut—probably the first in the history of the "Nutmeg State." The crop was made in a greenhouse, under the supervision of scientists at work in the Research Laboratories of American Cyanamid Company. Close laboratory control was necessary in order to observe the life habits of cotton plants from seeding time to harvest. Time lapse movie cameras recorded the life cycle of plant growth. Experiments were also made to observe the effect of a chemical which causes premature defoliation. The defoliation of cotton plants has become of special interest to cotton growers who want leafless cotton so that they can use mechanical harvesters in place of hand labor. More attention to plant breeding and chemical treatment in the growing of cotton promises to keep it in line with cellulose and synthetic fibres after the war is over. Many areas in the cotton belt feel sure that productive research of this type may well hold the answers to many long-standing economic problems of the cotton industry.

(*Below*) **HERDS OF ARGENTINE SHORTHORNS,** like this one below, are now supplying much of our increased Casein needs for industrial uses. Because most of the nation's milk production must now be used to supply the food needs of our soldiers and civilians, and those of our Allies, a critical situation has developed in domestic industrial Casein production—a commodity essential to the paper making industry. As exclusive agents for the well-known Dairyco brand of Argentine Casein, Cyanamid is in an exceptional position to supply customers with a uniform high quality "Premium" grade Casein. Tested to Cyanamid's high quality standards, Dairyco brand Casein provides a dependable source of supply on which the paper industry can rely.

(*Above*) **BUTTONS FOR THE SOVIET ARMY** and other Allied fighting units are being molded out of BEETLE*. Also serving all branches of America's own armed forces, these buttons are outstanding because of uniformity, smart appearance and resistance to repeated launderings. A Grade Two BEETLE is available in black and brown in one standard plasticity in a reduced price range to meet increased demands.


YOU ARE CORDIALLY INVITED TO
VISIT THE TITANIUM BOOTH
19th Exposition of Chemical Industries
December 6th to 11th, 1943
GENERAL OFFICES AND WORKS: NIAGARA FALLS, N. Y., U. S. A.
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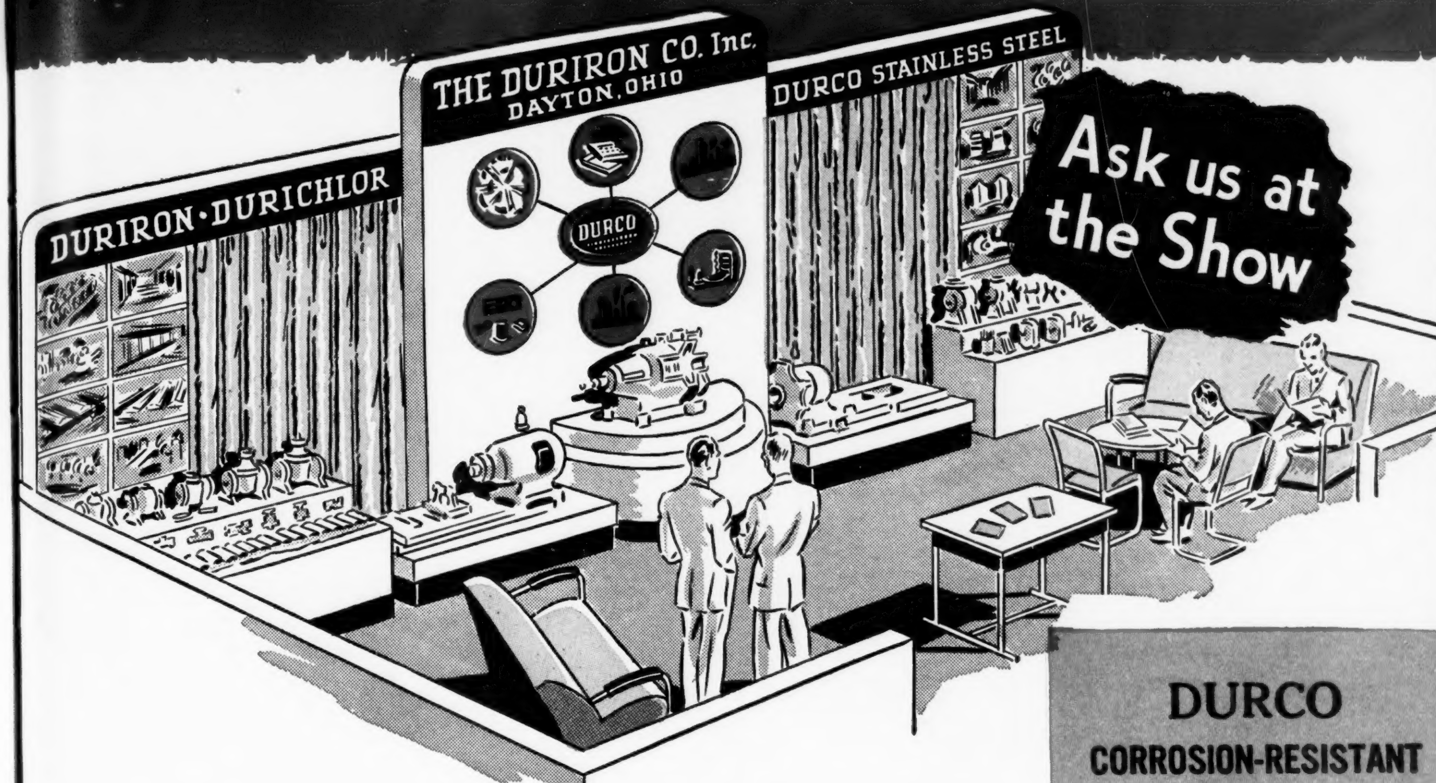
DO IT WITH DURIRON



During the past year we have talked to thousands of you over the long-distance phone . . . or wired you . . . or written you . . . about various problems of corrosion which have beset you.

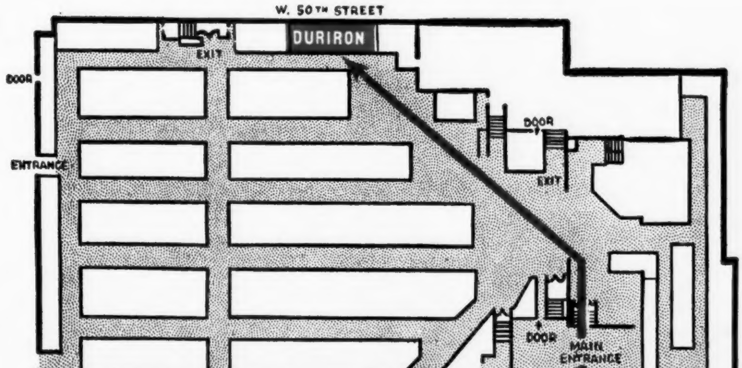
Now let's get together at the Chemical Exposition in New York and discuss them first hand.

Pack your brief case with blueprints and memos. See us at Booths 608-10. Let's make this a real war-time conference on "How to do it with Durco Alloys and Equipment." We'll be looking for you.

EXPOSITION FLOOR

Follow Arrow to

DURCO EXHIBIT



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Monel
Alloys to your specifications

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Mixing Nozzles
Kettles
Tank Outlets
Laboratory Equipment

ARMY E NAVY

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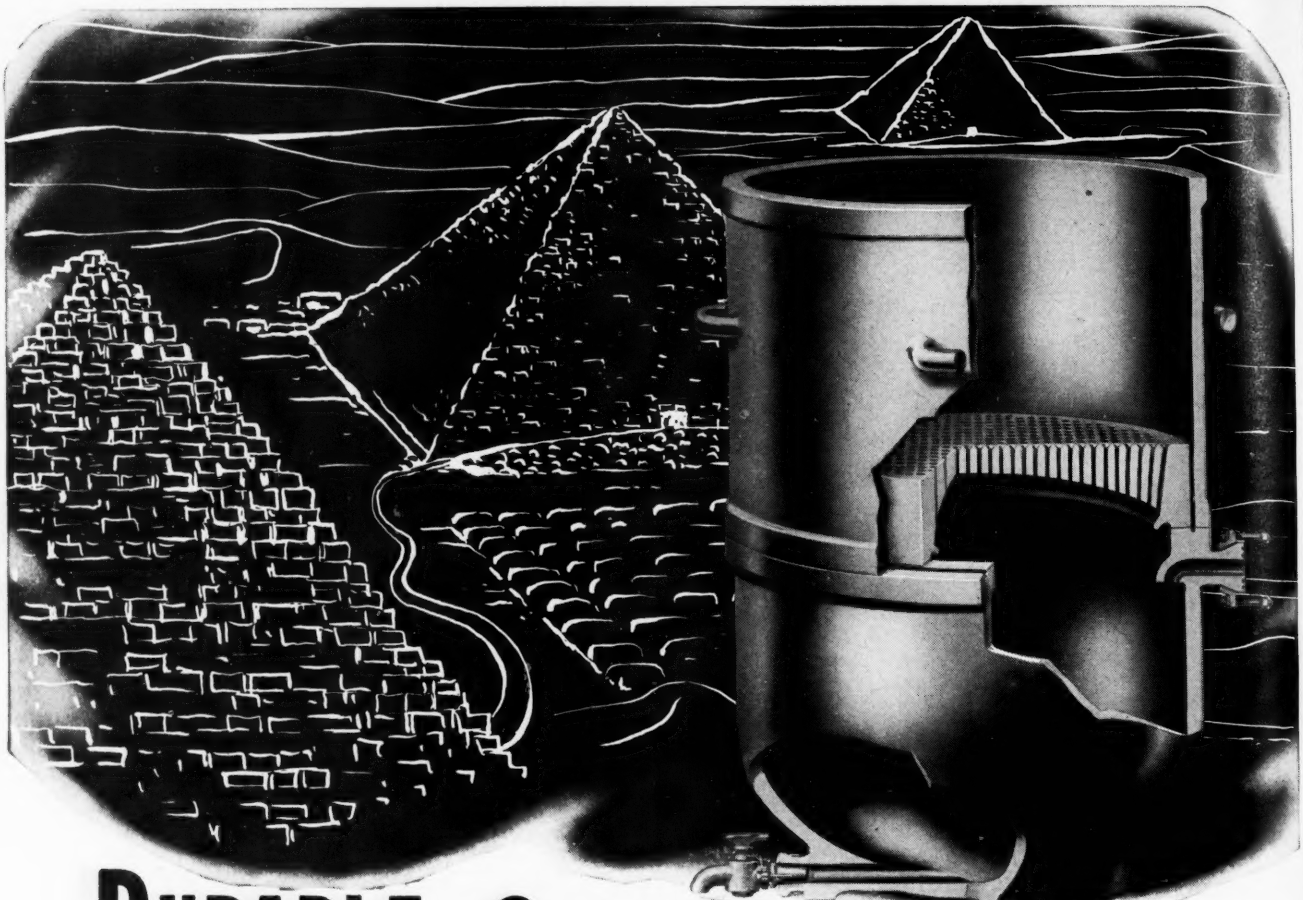


DURABLE · STABLE · PERMANENT

Four thousand-year-old pyramids and General Ceramics Chemical Stoneware have this in common — each endures. And yet General Ceramics Chemical Stoneware handles hot acids, highly corrosive chemical products that destroy most other structural materials.

Maybe we're stretching things a bit. Perhaps our Chemical Stoneware will not last for forty centuries — but we base this belief on the many records of long-life in our files, and a century of experience in the application of ceramics to industrial chemical problems.

Even if an installation of General Ceramics Chemical Stoneware only outlasts the building that houses it (as it can), you're still away ahead of the game. You've solved the problem of corrosion, contamination and leakage. And, because you eliminate periodical repair and replacement, the *first* cost is the *last* cost.

General Ceramics engineers will gladly furnish practical, up-to-date advice on all matters pertaining to the use of ceramic products in the chemical industries. On your next job, rely on their help—it's yours for the asking.

See our exhibit Booth #3 at the 1943 Exposition of Chemical Industries, Madison Square Garden, New York City, Dec. 6-11.

Chemical Stoneware is a generic name for a series of ceramic materials, the physical properties of which can be varied within remarkably wide limits. The following fourteen ceramic bodies are in regular production today and from them a selection can be made to satisfy most of the demands for General Ceramics Chemical Stoneware. Special bodies to meet exceptional conditions are available or are developed as required.

Body Symbol	Relative Pore Volume	Modulus of Rupture, lbs. per sq. in.	Modulus of Elasticity lbs. per sq. in.	Relative Resistance to Thermal Shock
D-63-F	2.1	3,820	8.2×10^6	4.5
D-63-G	2.3	4,140	8.6	5.0
F-8-F	2.3	4,270	8.7	4.5
F-8-G	3.0	4,480	8.7	5.0
D-64	0.8	9,800	9.4	4.5
D-57	0.7	10,100	9.5	4.5
SP-18-F	0.2	6,130	11.2	1.5
D-56	0.2	4,860	11.9	2.0
SP-17	1.1	5,070	11.2	8.0
B-41	2.9	6,660	15.0	10.0
SP-22	1.7	3,810	7.1	9.0
D-39	0.5	4,770	8.6	4.0
D-87	0.9	6,800	8.8	6.0
E-72-A	0.04	10,590	14.9	1.0

General Ceramics Co.

GENERAL CERAMICS COMPANY
CHEMICAL STONEWARE

CHEMICAL STONEWARE DIV.

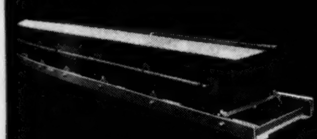
KEASBEY NEW JERSEY

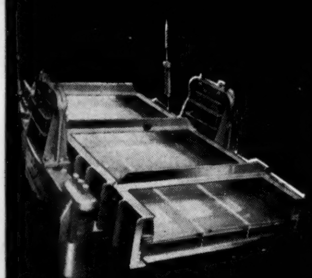
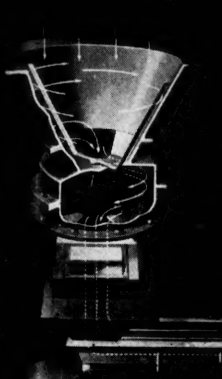
4619

Today's flight of the imagination becomes the commonplace of tomorrow. In chemistry great advances are now in the making. Creative chemists, working with new materials and new processes, are opening the way to important industrial achievements of the future.

SYNTHESIS WITH THE NITROPARAFFINS—few programs of research offer as great an opportunity! The unique versatility of these compounds has already led to important developments in widely different fields. May we bring you up to date on Nitroparaffin chemistry?

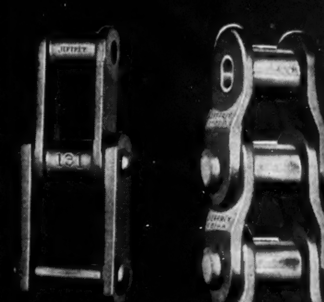
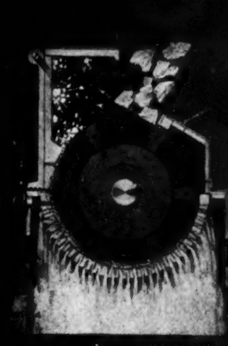


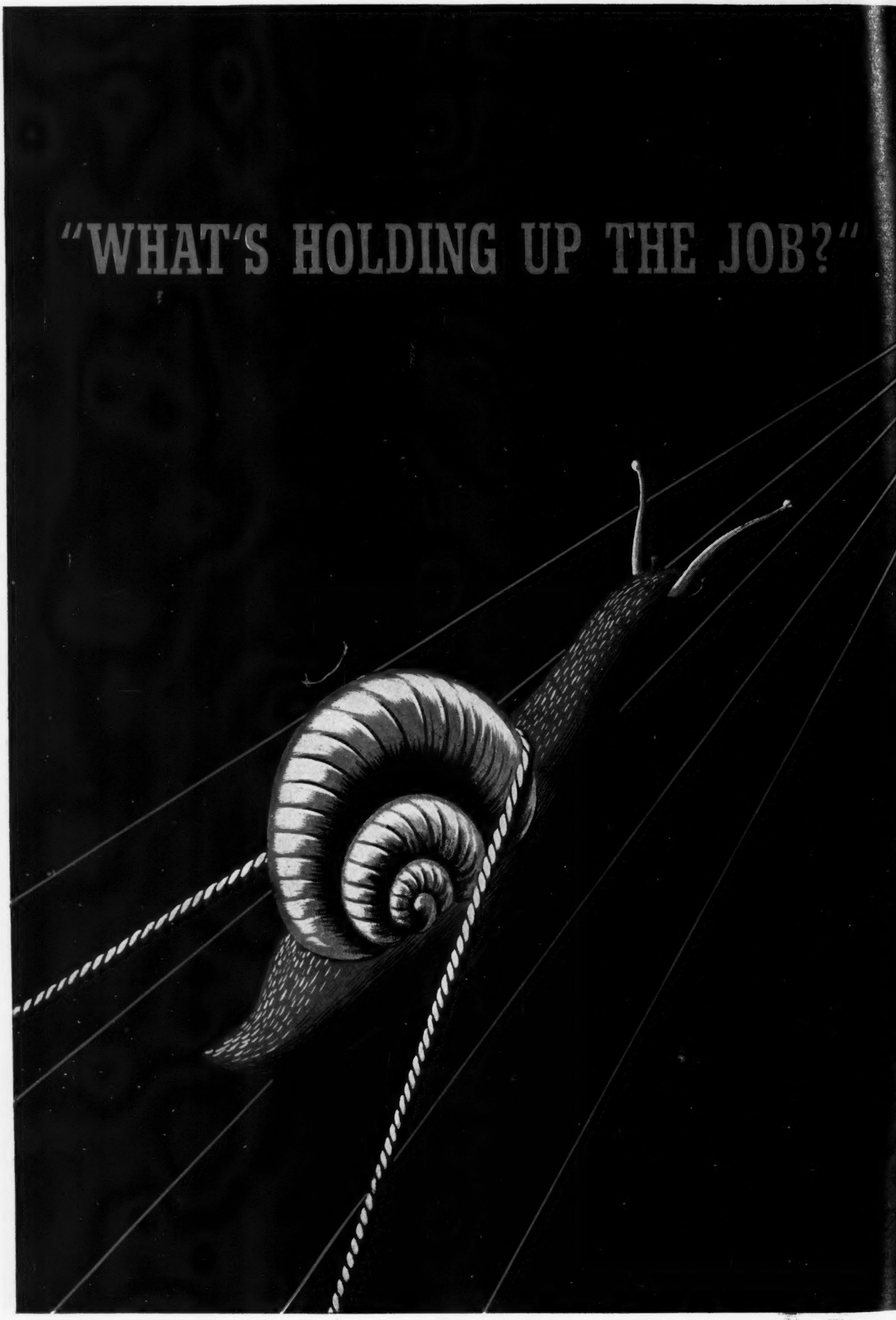


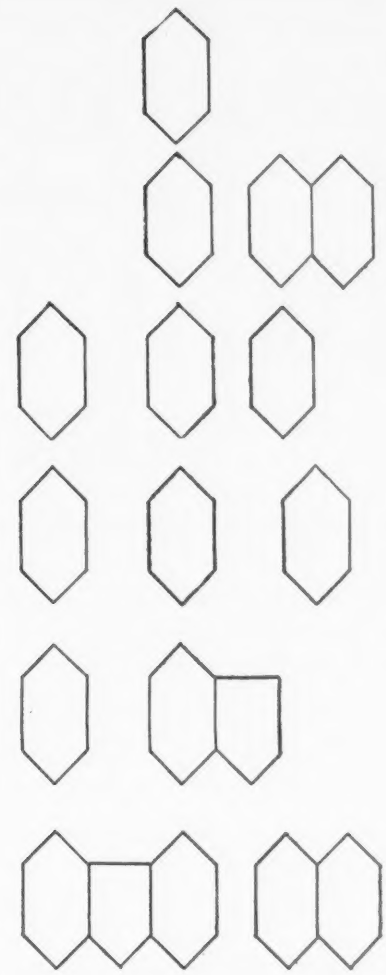









"WHAT'S HOLDING UP THE JOB?"



The chemicals that were *"discovered"* at a convention

Four years ago, at the Exposition of Chemical Industries, we put up a trial balloon.

We exhibited a list of 34 chemicals from coal. Some of them were well known commercial chemicals. But others on this list had no sizable known commercial uses. Their general physical and chemical properties were known, but commercially speaking, they were "orphans."

We frankly said *that* about them four years ago; but we also pointed out that the organic chemical industry was growing by leaps and bounds, that it needed things it had never needed before, that other chemicals derived from coal had proven important raw materials for the chemical industry, and that perhaps one of the "orphans" in the Koppers' booth might be exactly the thing for which some chemist was cudgeling his brains.

Since then we have sent out literally thousands of samples of those chemicals. We have worked with many men who saw some promise in them.

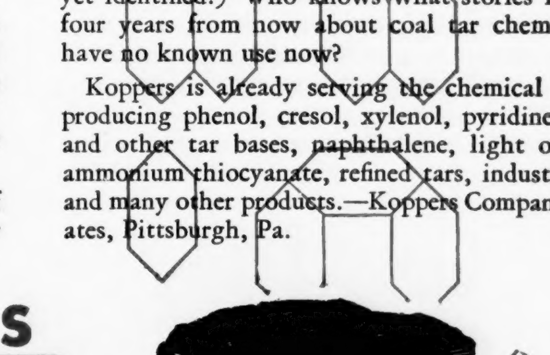
Today, several of them are in commercial production, and new plants have been built to recover them.

In early December, this year, the current Exposition of the Chemical Industries is being held. Koppers is there again to discuss possible applications of coal tar products. (There are over two hundred identified chemical compounds in coal tar and possibly many more not yet identified.) Who knows what stories may be told four years from now about coal tar chemicals which have no known use now?

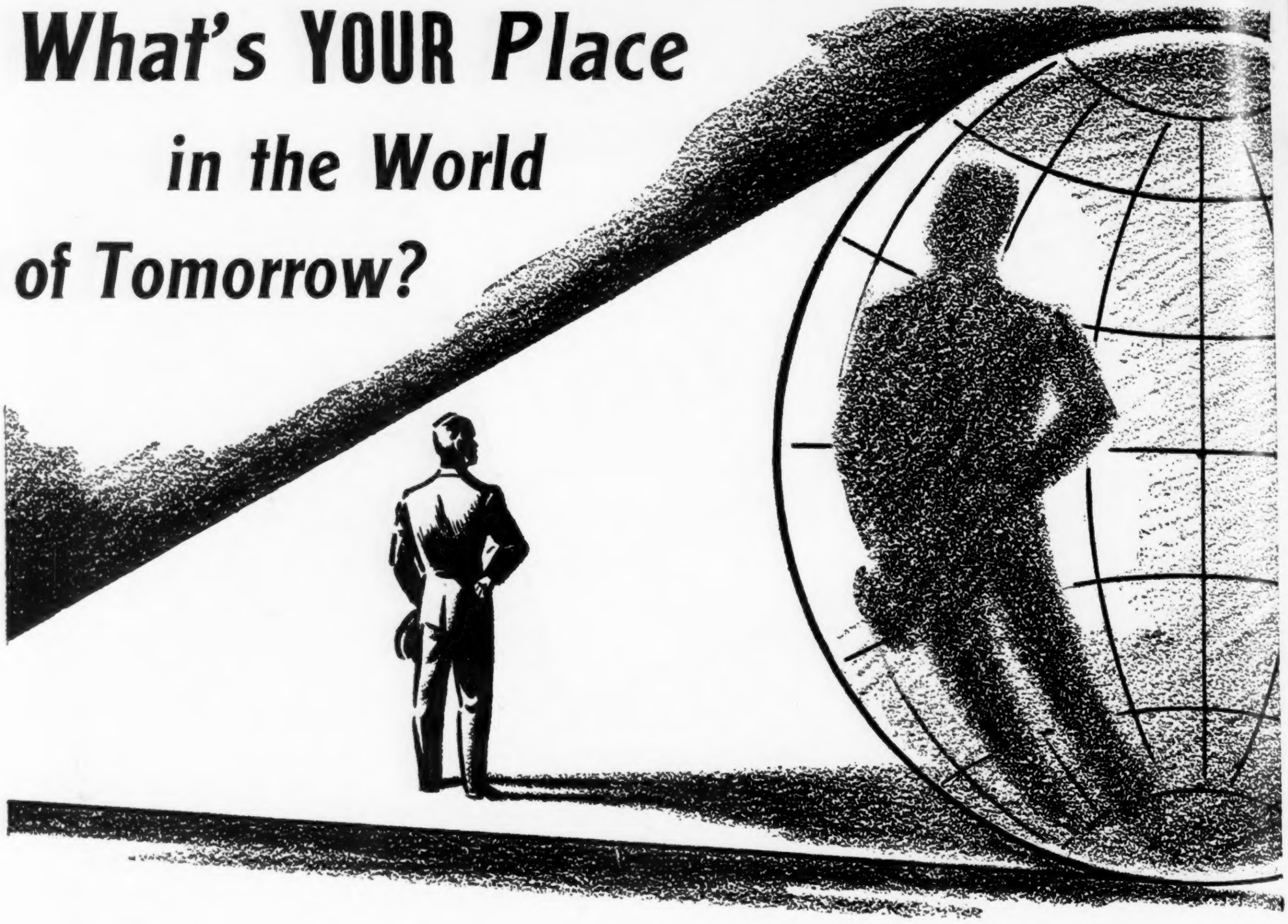
Koppers is already serving the chemical industry by producing phenol, cresol, xylenol, pyridine, quinoline, and other tar bases, naphthalene, light oil products, ammonium thiocyanate, refined tars, industrial pitches, and many other products.—Koppers Company and Affiliates, Pittsburgh, Pa.

KOPPERS

THE INDUSTRY THAT SERVES ALL INDUSTRY



What's **YOUR** *Place in the World of Tomorrow?*



Chemistry will play a major part in shaping the world of tomorrow. What will be your place in it? Your professional, business and personal interests depend on your course from now on. To shape your thought and action, to help you see clearly the trend of chemistry and engineering, visit this year's Exposition of Chemical Industries at New York's Madison Square Garden, December 6 to 11.

What you will see there at the exhibits, what you can learn there by discussion with exhibitors' technical representatives, may inspire and direct your thoughts into new channels.

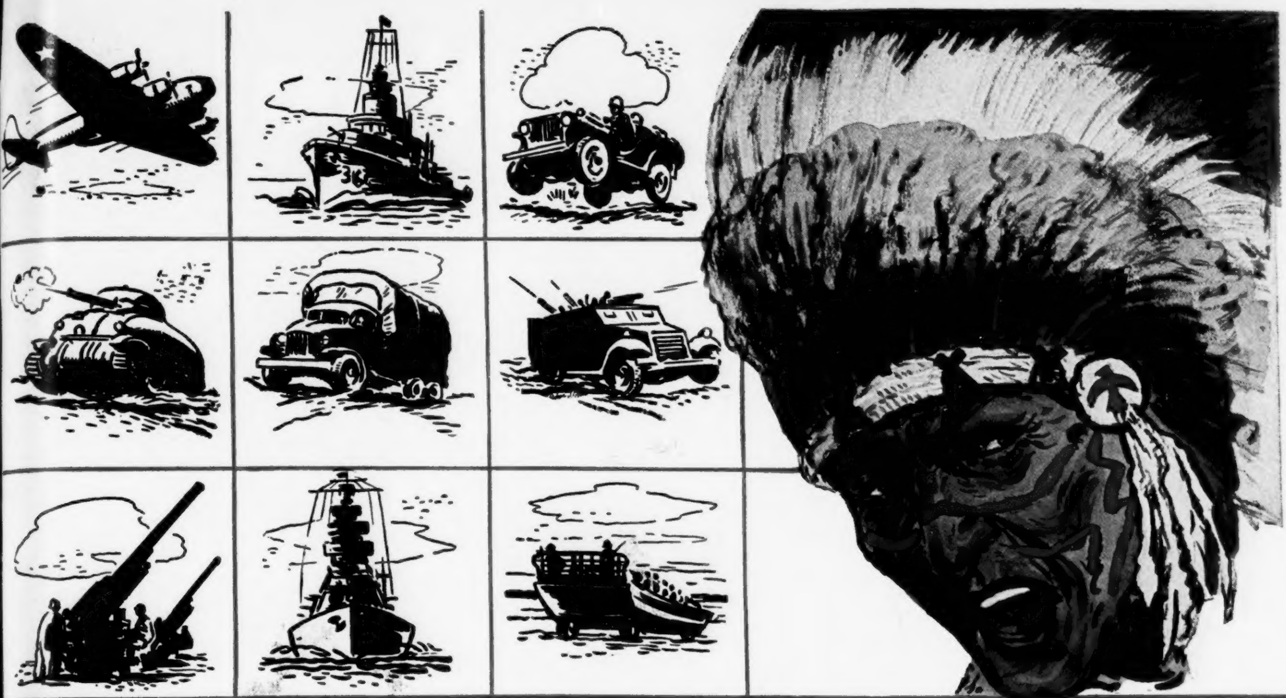
The wealth of new materials and equipment developed to meet the stress of war will profoundly affect every chemist, chemical engineer and production head throughout industry. For every executive responsible for the future of every business that depends on chemical processes in its own or in customers' plants, attending this Exposition is virtually essential.

Be sure to attend! Bring your associates too.

19th EXPOSITION OF CHEMICAL INDUSTRIES

MADISON SQUARE GARDEN • NEW YORK • DEC. 6-11, 1943

Managed by International Exposition Co.




What do

Duraglas TRADE MARK REG. U.S. PAT. OFF. **Amber Blakes are completely impartial on the Debate of SHELF-SAVING vs. LARGE LABELS**

IF maximum description space is needed, they have the answer.

IF conserving precious shelf frontage is in order, they have *that* answer, too.

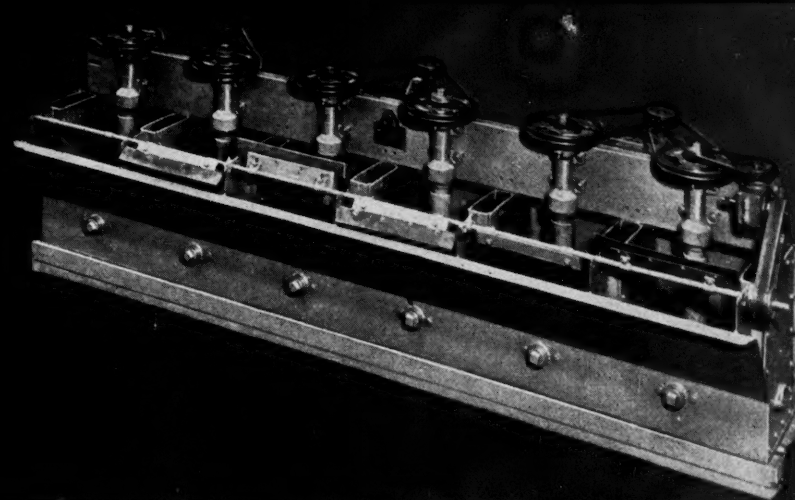
The twenty-four sizes (½ oz. to 32 oz.) of these strong, lightweight bottles are standard items. This means better service, faster delivery, economy.

Duraglas Amber Blakes are distinctive, intelligent packages—with ready-made acceptance among retailers and consumers who consider Duraglas containers tomorrow's packages, here today.

Even though both your production conditions and ours may make it impossible for you to adopt these Amber Blakes now, it is a line which deserves attention in your future packaging plans.

OWENS-ILLINOIS
GLASS COMPANY TOLEDO, OHIO

Flotation



FOR THE FLOTATION of non-metallics such as silica sand, magnesite, dolomite, coal, iron ... or to reclaim minerals such as abrasives and polishing minerals ... this new No. 8 Denver "Sub-A" Flotation Machine fills the present need for a unit to conduct development or research work. Chemical and industrial plants will find this machine valuable in beneficiation and concentration problems which cannot be solved by other methods

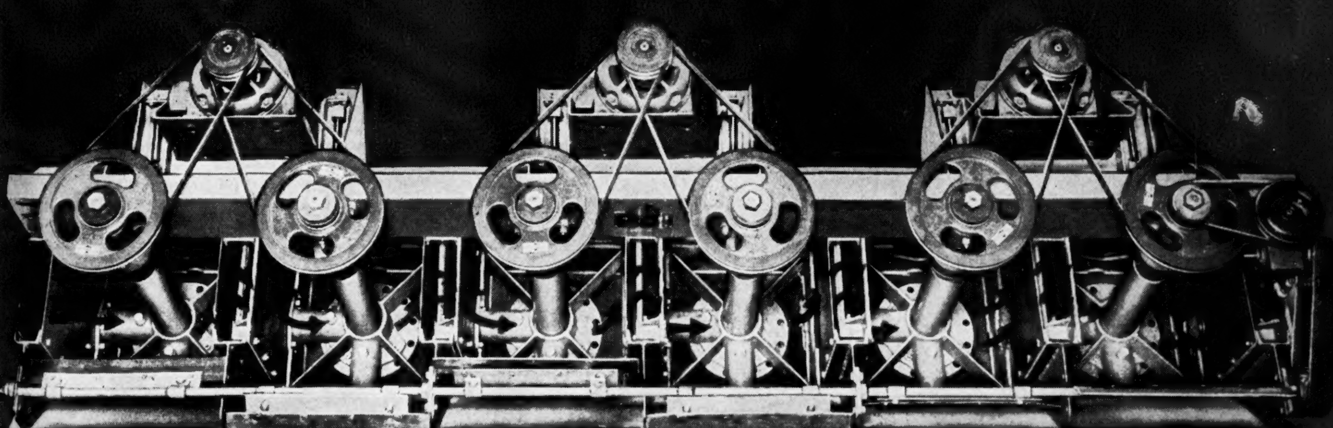
FOR CONTROL PURPOSES ... large concentrators can operate this small continuous *commercial* machine in parallel with standard units. *This No. 8 Denver "Sub-A"* is also valuable in flowsheets where there is a small amount of high-grade concentrate to be cleaned.

FOR CONTINUOUS PILOT PLANT operation this machine is ideal as it will operate "24-Hours per Day." Such performance is obtainable because it is a *commercial* flotation unit in every respect ... even though it will only handle from 500 to 1500 pounds an hour.

The No. 8 has the same advantages as all Denver "Sub-A" Flotation Machines ... exclusive *gravity flow* method of circulating material ... return of middling products from any cell to any other cell without pumps ... positive air control ... and qualities to make a high-grade concentrate and a low tailing.

Research laboratories will find this machine a new tool with which to experiment with flotation on a *small scale* and yet obtain comparable results on a *commercial* basis. Where can this machine be used in your plant?

Booth No. 211 — See Our Exhibit at the Exposition of Chemical Industries, December 6-11, Madison Square Garden, New York



DENVER EQUIPMENT COMPANY 24 HOUR SERVICE

NEW YORK CITY, NEW YORK: 50 Church St.
CHICAGO: Suite 1005, 69 W. Washington St.
SALT LAKE CITY, UTAH: 727 McIntyre Bldg.
TORONTO, ONTARIO: 45 Richmond St. W.

MEXICO, D. F.: Edificio Jalisco, Calle Ejido No. 7
MIDDLESEX, ENG.: 493A, Northolt Rd. S. Harrow
RICHMOND, AUSTRALIA: 530 Victoria Street
JOHANNESBURG, S. AFRICA: 8 Village Road

STANDARD RELIABLE EFFICIENT 24 HOUR SERVICE

DENVER EQUIPMENT COMPANY, 1400 17th St., Denver, Colorado


One of 3 carloads of Type 317 Stainless Clad Steel.
Type 304 Stainless Steel processing tanks.
13'-9" diameter x 10'-0" high Type 317 Stainless Clad Steel tank with false bottom.
12'-0" diameter Stainless Steel filters.
Three 12'-0" diameter x 6'-0" high Type 304 Stainless Clad Steel tanks.
Controlled
WELDING PROCEDURE
Here at Nooter the correct welding procedure for pure metal and alloys is definitely established through proven laboratory experiment. This has always been an unvarying Nooter policy.
For almost 50 years Nooter tanks, condensers, stills, chlorinators and dozens of other items have been used in almost every conceivable type of installation—and under the most strenuous service conditions. Yet, we are proud to say, no Nooter fabrication has ever experienced a welding failure.
We invite you to submit processing equipment specifications and blueprints to our engineering department for analysis and recommendations.
CROSS SECTION showing Nooter method of welding. The light area represents a series of welds—one on top of the other, so that when completed the 2 pieces of metal become a single, solid unit.
Write for Booklet—TODAY!!!
"Expert Fabrication of Steel, Pure Metal and Alloy Material"
Describes and illustrates the many ways NOOTER service and experience can be put to work for you.
JOHN NOOTER BOILER WORKS CO., 1400 S. 2nd St., St. Louis, (4) Mo.
NOOTER
ST. LOUIS
SERVING THE CHEMICAL AND METALLURGICAL INDUSTRIES FOR ALMOST 50 YEARS!

War-Time Chemicals
Peace-Time Applications

When you visit the National Chemical Exposition at the Madison Square Garden, December 6-11, be sure to make a point of calling at our booth No. 528. Many new chemicals on display for the first time may suggest answers to your present war-time problems, and ideas for future development. Chemists from our laboratories will be on hand to discuss these and other materials manufactured by us.

If you are unable to attend the show, write now for your copy of our new 1944 catalogue. Here many new ideas, formulae, and complete information on a wide selection of synthetic materials will be presented for the first time. You may find the answer to your war-time problems, and at the same time discover new uses of our products with post-war applications. Let us hear from you today; we'll mail your copy of the 1944 edition of "Chemicals by Glyco," as soon as it is off the press.

Check List of GLYCO PRODUCTS and the Industries which Use Them.

PRODUCTS

- Polyhydric Alcohol Esters
- Polyhydric Alcohol Ether Esters
- Cyclic Alcohol Esters
- Emulsifying Agents
- Plasticizers and Flexibilizers
- Special Emulsions
- Flameproofing and Waterproofing
- Synthetic Resins, soluble
- Synthetic Resins, insoluble
- Wetting and Foaming Agents
- Defoaming Agents
- Synthetic Waxes
- Preservatives
- Deodorizing Agents

INDUSTRIES

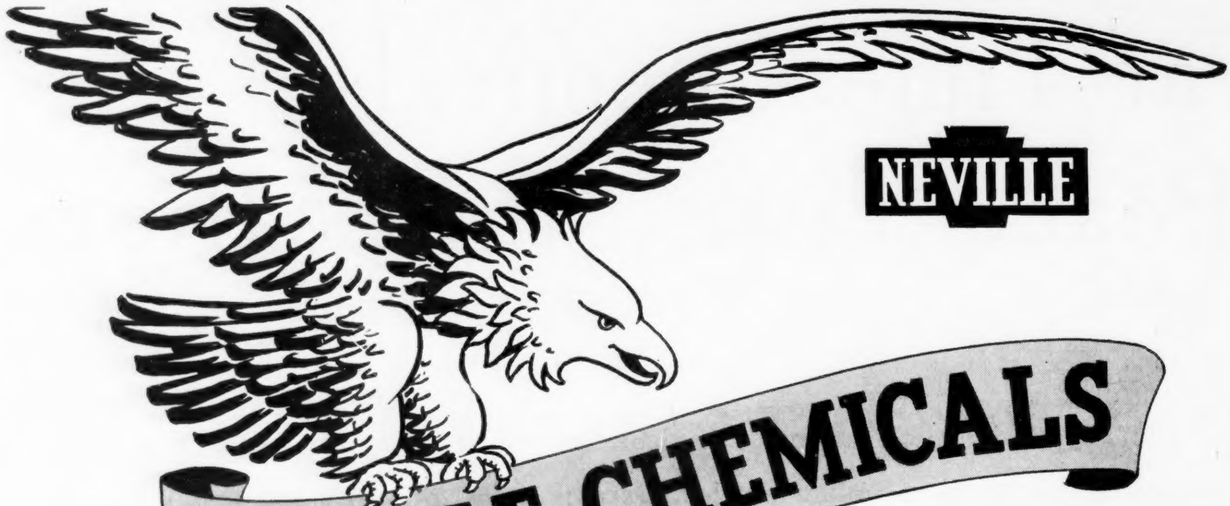
- Abrasives
- Adhesives
- Cements
- Ceramics
- Coatings
- Cork
- Leather
- Lubrication
- Metals
- Oils
- Paper
- Pharmaceuticals
- Pigments
- Plastics
- Polishes
- Printing Inks
- Rubber, Synthetic Rubber
- Soaps and Cleaners
- Textiles
- Wood

Booth 528

GLYCO PRODUCTS CO., INC.

CHEMICALS BY GLYCO

26 COURT STREET, BROOKLYN 2, N. Y.



NEVILLE

NEVILLE CHEMICALS

..serving the war program

★DIBUTYL PHTHALATE
for binding smokeless powder, for softeners for synthetic rubber, for plasticizing cellulose esters and ethers.

★RESINS FOR ADHESIVES
to replace and extend more critical rubber, latex and vinyl resins (used in shoe adhesives, adhesives for sealing containers for vitamins, food containers, etc., for Army, Navy and overseas shipments).

★RESINS AND SOLVENTS
for waterproof and flameproof impregnants for cotton duck, used for Jeep tops, tents, tarpaulins, etc.

★SOLVENTS (TOLLAC-NEVSOL)
for replacing toluol, which is so essential to TNT production.

★GUANIDINE NITRATE
an ammunition component.

★CREOSOTE OIL
for wood-preserving . . . ties for railroads, piles for new ship bases.

★NEVILLAC RESINS
for grease-proof and water-proof papers for packaging aircraft parts, rifles, Army rations (outside wrappers), machine parts, and other war equipment.

★WIRE ENAMEL THINNERS
for magnetic wires—for radio transmission, etc.

★RESINS FOR ANTI-FOULING
shipbottom paint for Navy Ships.

★RESINS AND THINNERS
for protective coatings for all types of war goods.

★RUBBER-COMPOUNDING OILS AND RESINS
for war-essential rubber manufacture.

★ICE PREVENTATIVE OIL
for treatment of aeroplane rubber spinner caps to minimize ice accumulation.

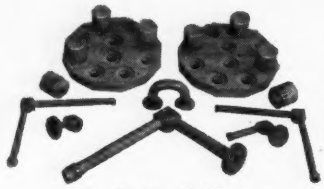
THE NEVILLE COMPANY

PITTSBURGH · PA.

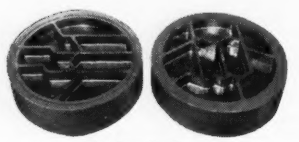
BENZOL • TOLUOL • XYLOL • TOLLAC • NEVSOL • CRUDE COAL-TAR SOLVENTS
HI-FLASH SOLVENTS • COUMARONE-INDENE RESINS • TERPENE RESINS • TAR PAINTS
RUBBER COMPOUNDING MATERIALS • WIRE ENAMEL THINNERS • DIBUTYL PHTHALATE
RECLAIMING, PLASTICIZING, NEUTRAL, CREOSOTE, AND SHINGLE STAIN OILS

A-8

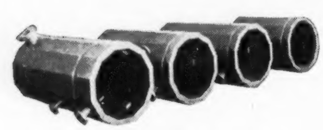
Porous Carbon Diffuser



Pipe, Fittings, Bubble Caps and Trays



Headers for heat exchanger



Sections of segmental type reaction tower

Tube and shell heat exchange unit

For Continuous and Reliable Service

NATIONAL AND KARBATE CARBON AND GRAPHITE PRODUCTS
TRADE-MARK TRADE-MARK

are extremely versatile and readily adapted to the construction of equipment of conventional design as well as special equipment of new design.

Outstanding performance and economies, along with simplification of design, are made possible by the following unique and advantageous combination of physical and chemical properties offered by these materials.

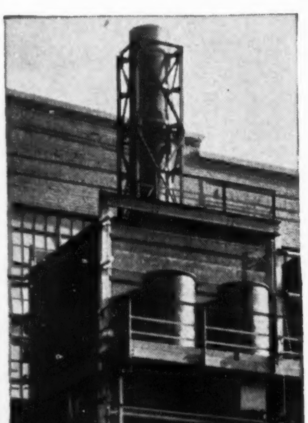
Resistance to severe thermal shock ✓ No deformation at high temperatures ✓ Not wet by molten metals—no sticking ✓ Mechanical strength maintained at high temperatures ✓ No reaction with most acids, alkalies and solvents—no contamination ✓ High rate of heat transfer (Graphite and graphite base "Karbate" products) ✓ Low rate of heat transfer (Carbon and carbon base "Karbate" products) ✓ Low thermal expansion ✓ Good electrical conductivity ✓ Self-lubricating ✓ Available in impervious grades ✓ Available in highly permeable (porous carbon and graphite) grades ✓ Easily machined and fabricated.

Practically any design can be machined or fabricated from available stock in the form of beams, blocks, slabs, brick, plates, round and rectangular rods, tubes and cylinders, pipe, fittings, valves, tower sections and tower accessories.

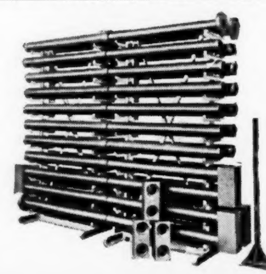
Special shapes or forms can be molded or extruded when quantity justifies.

The illustrations show only a few of the many diversified applications of these products.

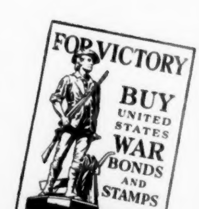
Write for descriptive literature



47' high all-carbon electrostatic precipitator



Return bend cooling coil



NATIONAL CARBON COMPANY, INC.

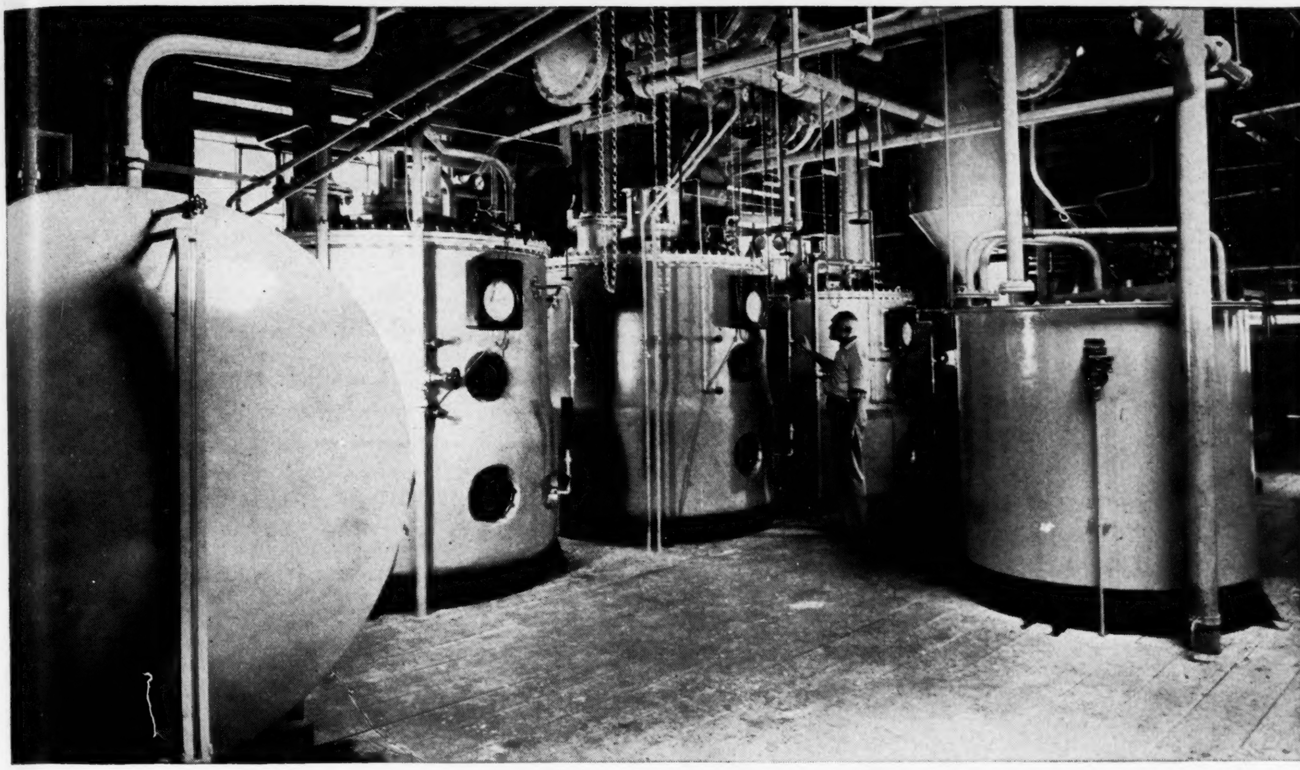
Unit of Union Carbide and Carbon Corporation

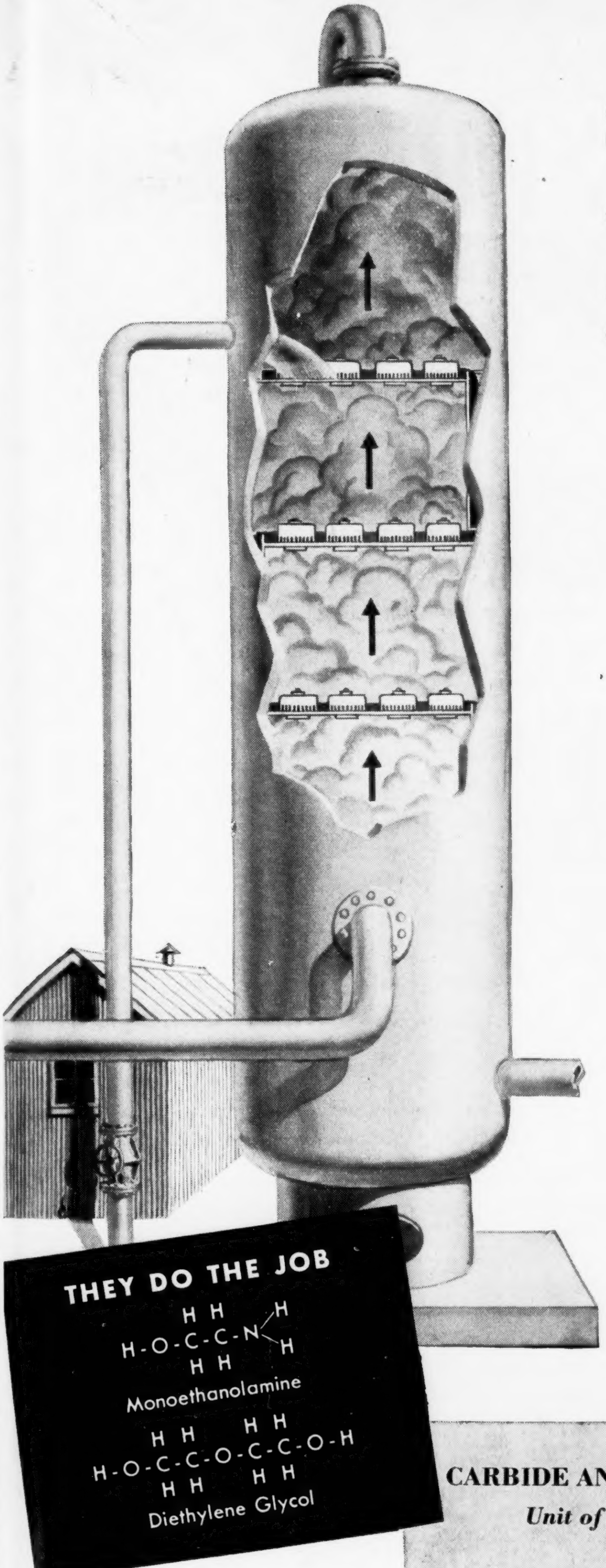
UCC

CARBON PRODUCTS DIVISION, CLEVELAND, OHIO

General Offices: 30 East 42nd St., New York, N. Y.

Branch Sales Offices: New York - Pittsburgh - Chicago - St. Louis - San Francisco





Straining Trouble out of Natural Gas

How two synthetic organic chemicals are solving a tough industrial problem

Small amounts of water vapor and hydrogen sulfide in high-pressure natural gas transmission lines can give pipe line engineers lots of trouble. Water vapor combines with components of the gas to form "natural gas hydrates," which are solid at temperatures as high as 60°F. and thus clog the lines and seriously interfere with pipe line capacity. Hydrogen sulfide normally present in the gas causes corrosion in pipes, meters, valves, and burners.

Many methods were tried to get these troublemakers out of the gas, but the pipe line companies were looking for a better way.

The Diethylene Glycol made by the Carbide and Carbon Chemicals Corporation will pick up water; the Ethanolamines will combine with acid gases, such as H_2S. By using Diethylene Glycol and the Ethanolamines in efficient equipment both troublemakers are "strained" out of the gas, and the chemicals are purified for re-use.

Where these chemicals are being used, more gas can be put through pipe lines; and "sour" gas, never before usable, has been cleaned up for commercial use.

Hundreds of industrial problems are being solved with the chemicals we make. If you have a problem that needs a chemical answer, write to us.

BUY UNITED STATES WAR BONDS AND STAMPS

CARBIDE AND CARBON CHEMICALS CORPORATION

Unit of Union Carbide and Carbon Corporation

UCC

30 East 42nd Street, New York 17, N. Y.

PRODUCERS OF SYNTHETIC ORGANIC CHEMICALS

PENN SALT CAUSTIC SODA

Prompt shipments in tank cars specially designed for fast, easy, safe unloading

• Order your caustic soda from Penn Salt and enjoy the advantages of quick shipment, clean caustic and speedier handling.

Penn Salt's special tank cars are built with protective lining, special draining plates and caustic-resistant valves and interior connections. Steam heating coils do *not* contact the caustic soda—eliminating possible contamination.

The improved, insulated design assures *fluid* caustic in cold weather. And the easily accessible fittings save unloading time and prevent waste. Furthermore, the dome safety platform and guardrailing protect your workmen.

Penn Salt caustic soda is available in tank car quantities as 50% and 72-73% solutions . . . as a solid in 750 lb. drums . . . or in flake form in 400 lb. and 125 lb. drums.

Technical help on any handling problem without obligation. Write for complete information about Penn Salt caustic soda.

PENNSYLVANIA SALT MANUFACTURING COMPANY
Chemicals
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New York • Chicago • St. Louis • Pittsburgh • Minneapolis
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Darco and Hydrodarco for Purification

Darco Corporation manufactures activated carbons for purifying, decolorizing and refining. The needs of war have speeded the development of many new wrinkles of application and use. Some of these may be important to you. Darco's technical staff will be at the "Chem Show" to talk things over.

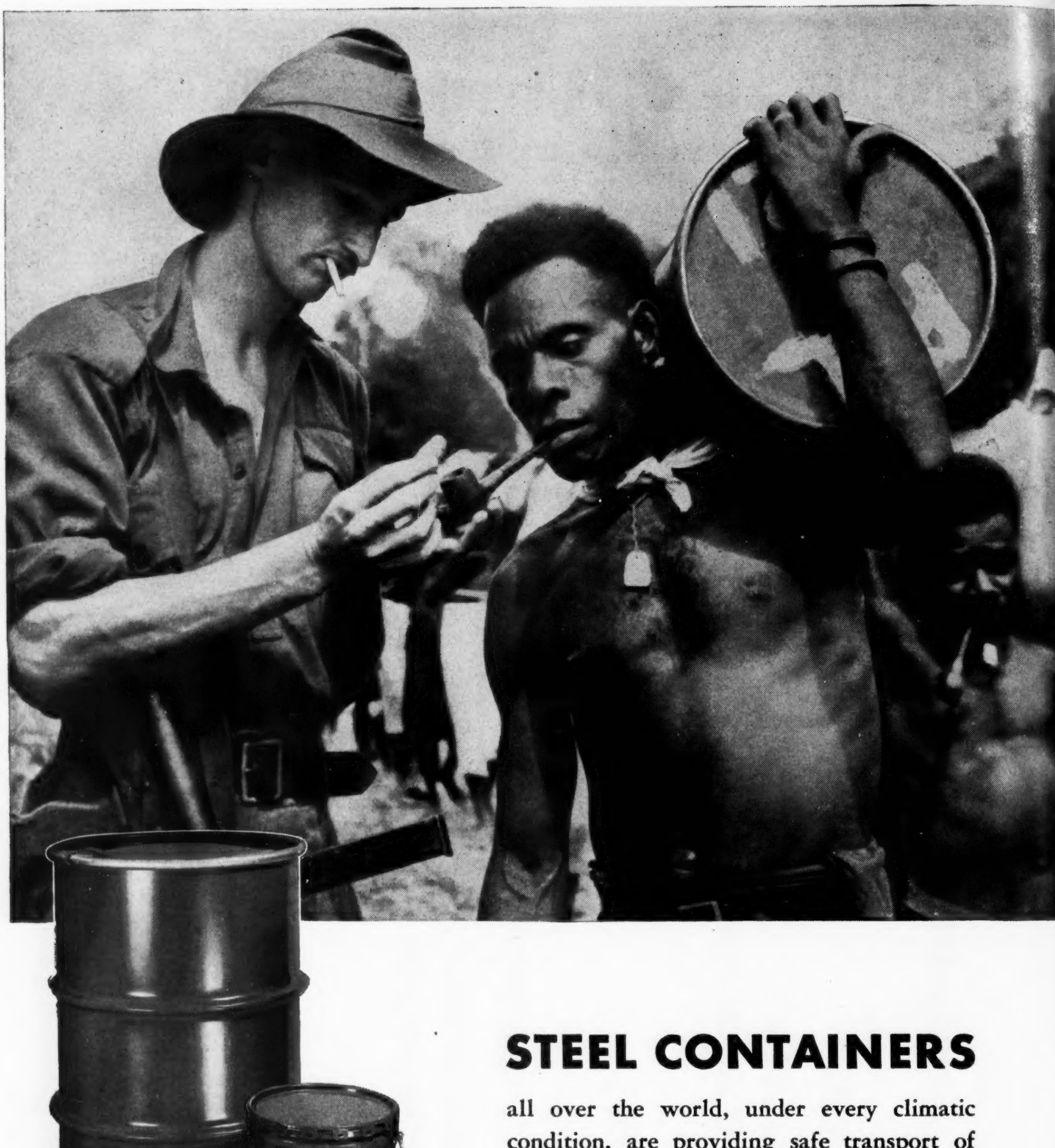
DARCO

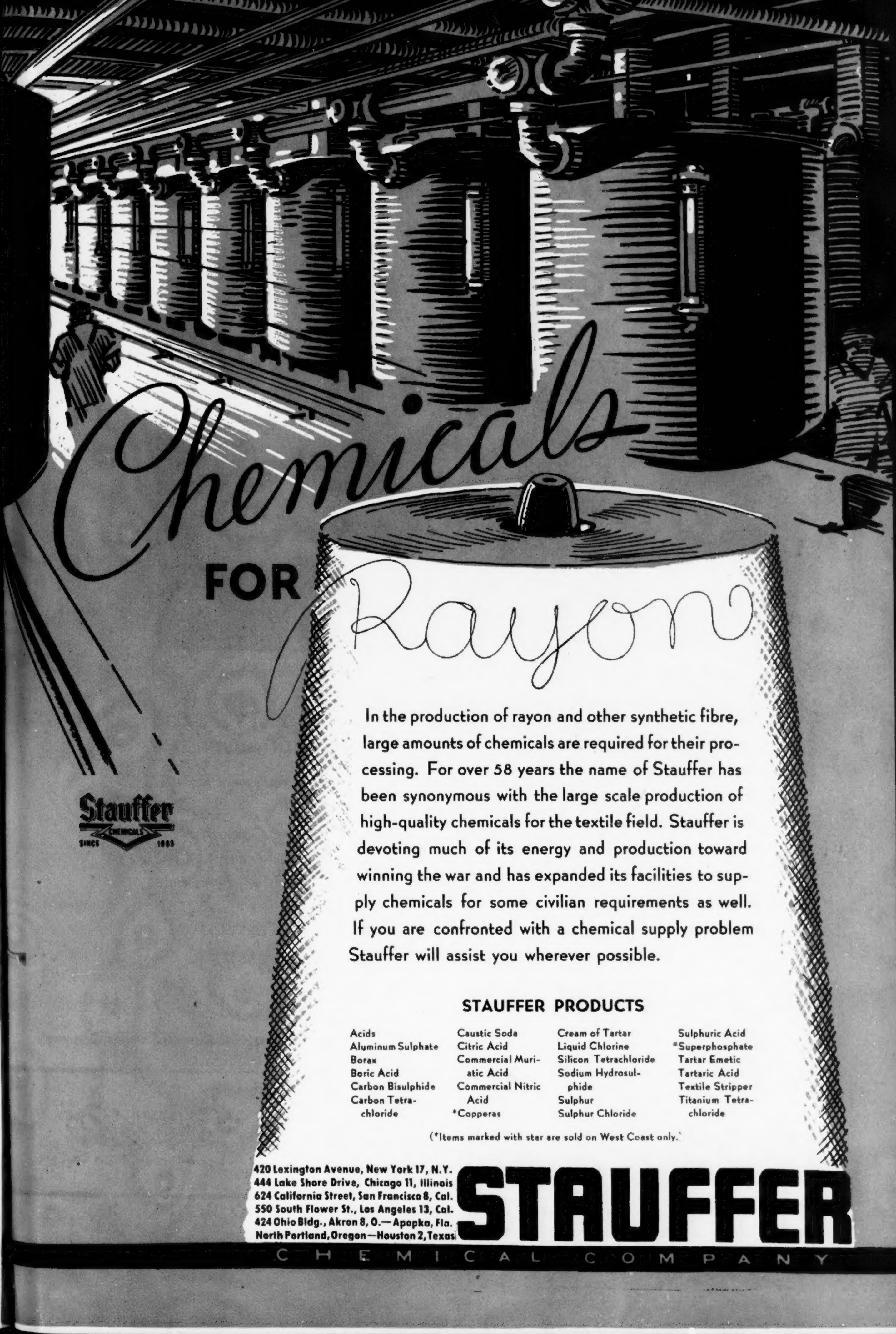
DARCO—REG. U. S. PAT. OFF.

DARCO CORPORATION

60 East 42nd Street, New York 17, N.Y.

Subsidiary Atlas Powder Company





Chemicals
FOR
Rayon
In the production of rayon and other synthetic fibre, large amounts of chemicals are required for their processing. For over 58 years the name of Stauffer has been synonymous with the large scale production of high-quality chemicals for the textile field. Stauffer is devoting much of its energy and production toward winning the war and has expanded its facilities to supply chemicals for some civilian requirements as well. If you are confronted with a chemical supply problem Stauffer will assist you wherever possible.
STAUFFER PRODUCTS
Acids
Aluminum Sulphate
Borax
Boric Acid
Carbon Bisulphide
Carbon Tetrachloride
Caustic Soda
Citric Acid
Commercial Muriatic Acid
Commercial Nitric Acid
*Copperas
Cream of Tartar
Liquid Chlorine
Silicon Tetrachloride
Sodium Hydrosulphide
Sulphur
Sulphur Chloride
Sulphuric Acid
*Superphosphate
Tartar Emetic
Tartaric Acid
Textile Stripper
Titanium Tetrachloride
(*Items marked with star are sold on West Coast only.)
Stauffer Chemicals Since 1885
420 Lexington Avenue, New York 17, N.Y.
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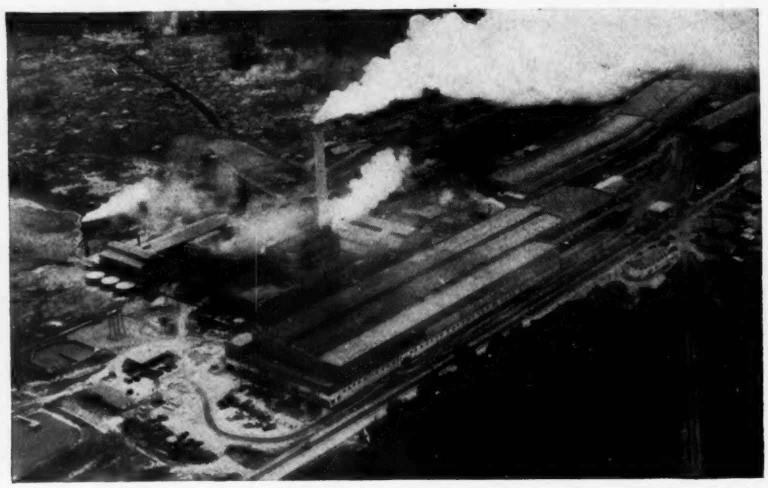
624 California Street, San Francisco 8, Cal.
550 South Flower St., Los Angeles 13, Cal.
424 Ohio Bldg., Akron 8, O.—Apopka, Fla.
North Portland, Oregon—Houston 2, Texas
STAUFFER
CHEMICAL COMPANY

about paper bags

THE largest and most modern Heavy Duty Multiwall Paper Bag plant in the world is located at Camden, Arkansas, adjacent to our own pulp and paper mills and near-by timber lands.



Here is made every type of Multiwall Paper bag

SEWN VALVE BAGS • PASTED VALVE BAGS
SEWN OPEN MOUTH BAGS • PASTED OPEN MOUTH BAGS

In addition, we furnish spouts, scales and closing equipment for both types of open mouth bags.

Our experienced engineers in your locality will be glad to study your packaging problem; recommending the use of the proper type of bag and the necessary closing and filling equipment. This, of course, without obligation.

INTERNATIONAL PAPER PRODUCTS DIVISION
INTERNATIONAL PAPER COMPANY
220 East 42nd Street, New York 17, N. Y.

Agents for

Bagpak, Incorporated

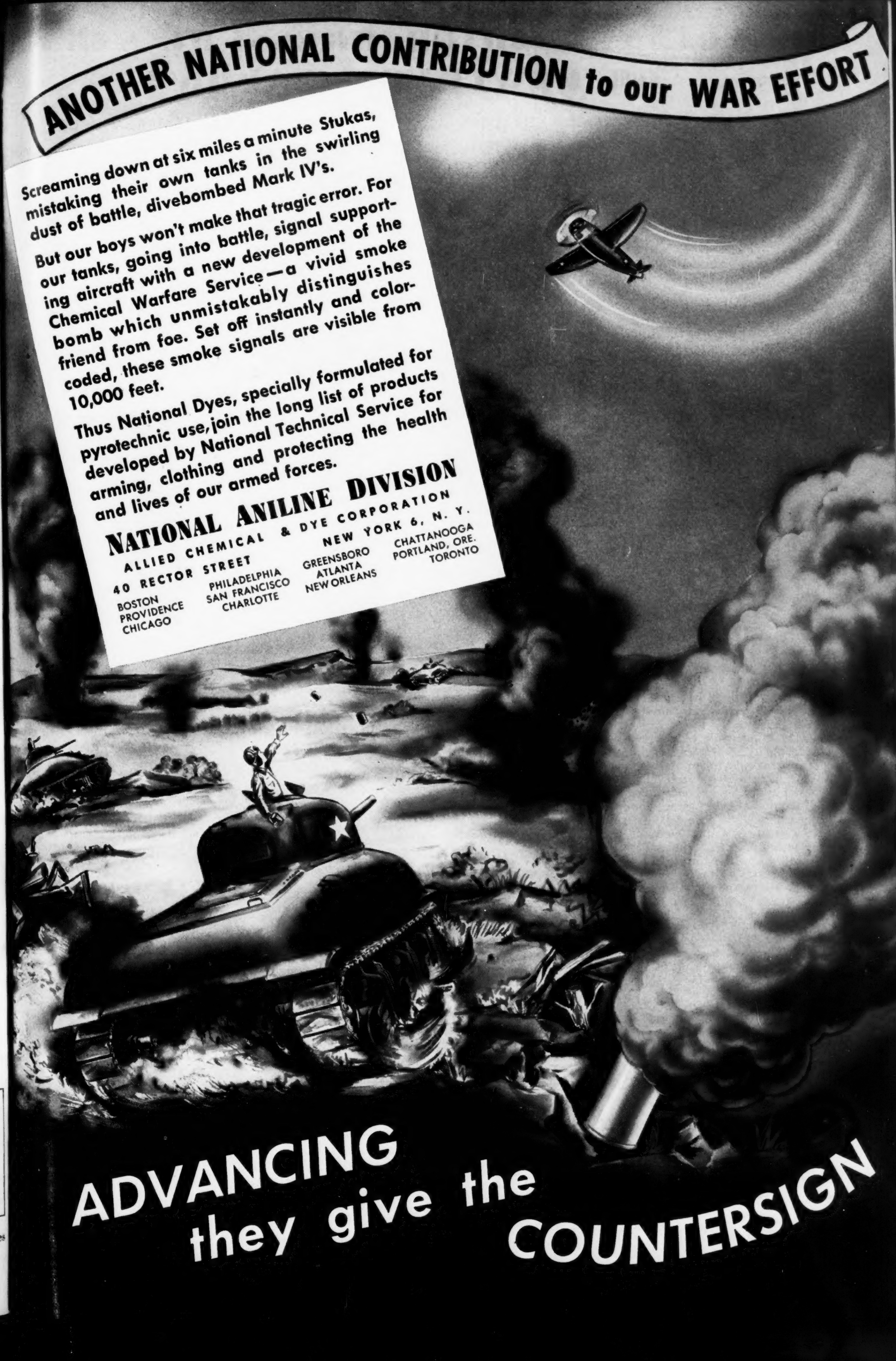
George & Sherrard Paper Company

ALL-WEATHER KRAFT
BAGPAK INC.

* *Trade Mark reg. U. S. Pat. Off.*

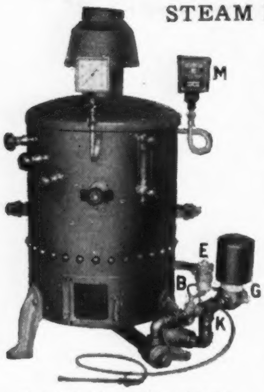
KRAFT
GATORHIDE GATORHIDE
George & Sherrard Paper Co.

ONE-MAN PACKAGE EASY TO HANDLE


ANOTHER NATIONAL CONTRIBUTION to our WAR EFFORT
Screaming down at six miles a minute Stukas, mistaking their own tanks in the swirling dust of battle, divebombed Mark IV's.
But our boys won't make that tragic error. For our tanks, going into battle, signal supporting aircraft with a new development of the Chemical Warfare Service—a vivid smoke bomb which unmistakably distinguishes friend from foe. Set off instantly and color-coded, these smoke signals are visible from 10,000 feet.
Thus National Dyes, specially formulated for pyrotechnic use, join the long list of products developed by National Technical Service for arming, clothing and protecting the health and lives of our armed forces.
NATIONAL ANILINE DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 RECTOR STREET NEW YORK 6, N. Y.
BOSTON PROVIDENCE CHICAGO PHILADELPHIA SAN FRANCISCO CHARLOTTE GREENSBORO ATLANTA NEW ORLEANS CHATTANOOGA PORTLAND, ORE. TORONTO
ADVANCING they give the COUNTERSIGN

DO YOU NEED HIGH PRESSURE STEAM OR DOWTHERM VAPOR?

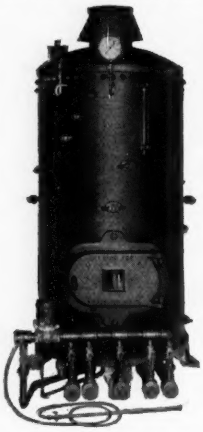
STEAM BOILERS OR GENERATORS



Gas Fired Type C Boiler

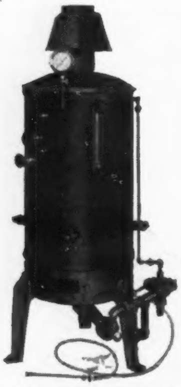
For nearly 40 years, the Eclipse Fuel Engineering Company has made a specialty of building small, high pressure steam boilers or generators. Built in strict accordance with A.S.M.E. Boiler Construction Code and State and local laws for pressures up to 300 lbs. per square inch and more.

It is usually possible to obtain stock shipment in the following sizes: ½, ¾, 1, 2, 3, 4, 5, 6, 7, 8, 10, 12, 15, 18, 24, 25, 30, 38, 45, 50, 60, and 75 H.P.—larger sizes built to special order.



Gas Fired Type 3-A Boiler

These McKee Boilers can be furnished for burning manufactured gas, natural gas, mixed gas, bottled gas, or fuel oil. Also for gasoline or kerosene on special order.



Gas Fired Type D Boiler

They can be furnished complete with automatic controls and automatic water feeding equipment. That is, a completely automatic "steam-boilerplant" can be furnished:

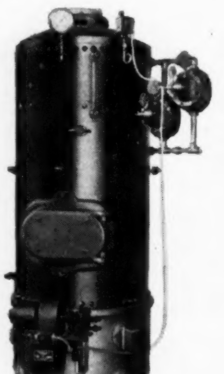
1. Automatic control of steam pressure,
2. Automatic control of fuel,
3. Automatic addition of new make up water,
4. Automatic return of hot condensate,
5. Automatic low water fuel cutoff,
6. Automatic flame failure protection.

McKee Boilers are made in the vertical fire tube type and in the horizontal internally fired type.

Some have small water capacity for quick steaming while others have large water capacity to deliver large amounts of steam for short periods of time.

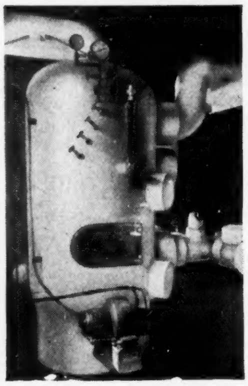
Some have low water level to make it possible to have boiler and steam using equipment on same floor level and yet make possible gravity return of condensate without pump or traps.

Extensively used throughout the chemical industry for heating autoclaves, presses, dryers, evaporators, stills, and hundreds of special applications. Very popular for use in isolated locations where cost of running long steam line is prohibitive. Also widely used in summer months or during off-peak periods to eliminate waste caused by operating large boiler plant at low load.



Oil Fired 3-AO Boiler

FOR THE HIGHER TEMPERATURES



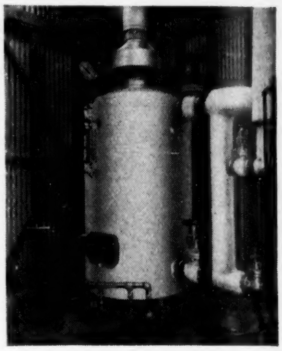
300,000 B.T.U. Oil Fired Dowtherm Vaporizer

High pressure steam is the ideal medium for processes requiring temperatures up to 175° C. (350° F.). For temperatures higher than that up to 340°C. (approx. 650°F.) Dowtherm is the recommended heat transfer medium.

Dowtherm is a non-corrosive, non-scale forming, non-toxic heat transfer medium giving high temperatures at low pressures. At 343°C. (650° F.) the pressure is less than 55 lb. gauge. Vapor phase or liquid phase heating can be used. Dowtherm vapor is just like steam in that its temperature always corresponds to the pressure and upon condensing it liberates a tremendous amount of latent heat.

The Dowtherm is heated in a special McKee Dowtherm Vaporizer and changes into a vapor just as water changes into steam. This vapor, which is at high temperature but low pressure, is carried through steel piping to a jacketed autoclave or coil just as steam is. In some cases the Dowtherm is not vaporized but is used in the liquid state being circulated through the process vessel.

Dowtherm does not attack any metal. Among the equipment heated by McKee Dowtherm Vaporizers and Heaters are autoclaves, evaporators, stills, vacuum pans, molding presses, tin pots, asphalt tanks, drying ovens, paper rolls, oil compounding kettles, etc.



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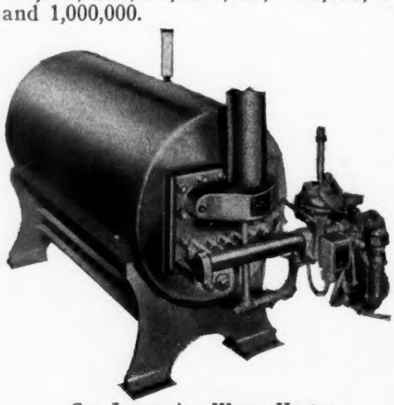

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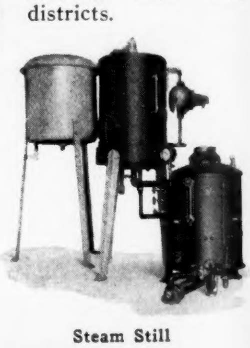

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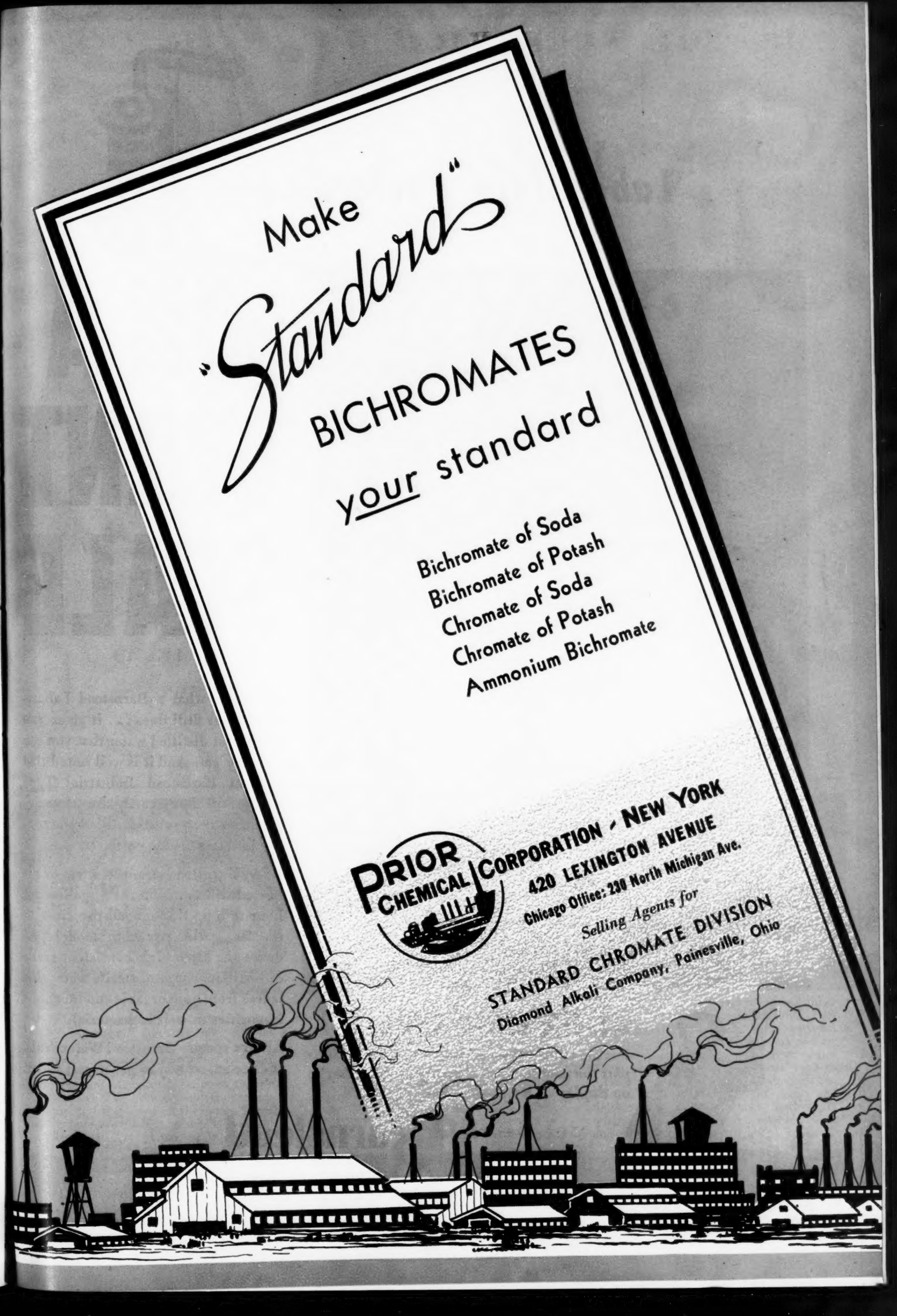
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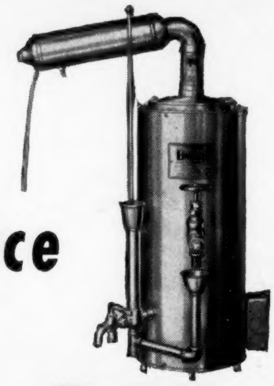

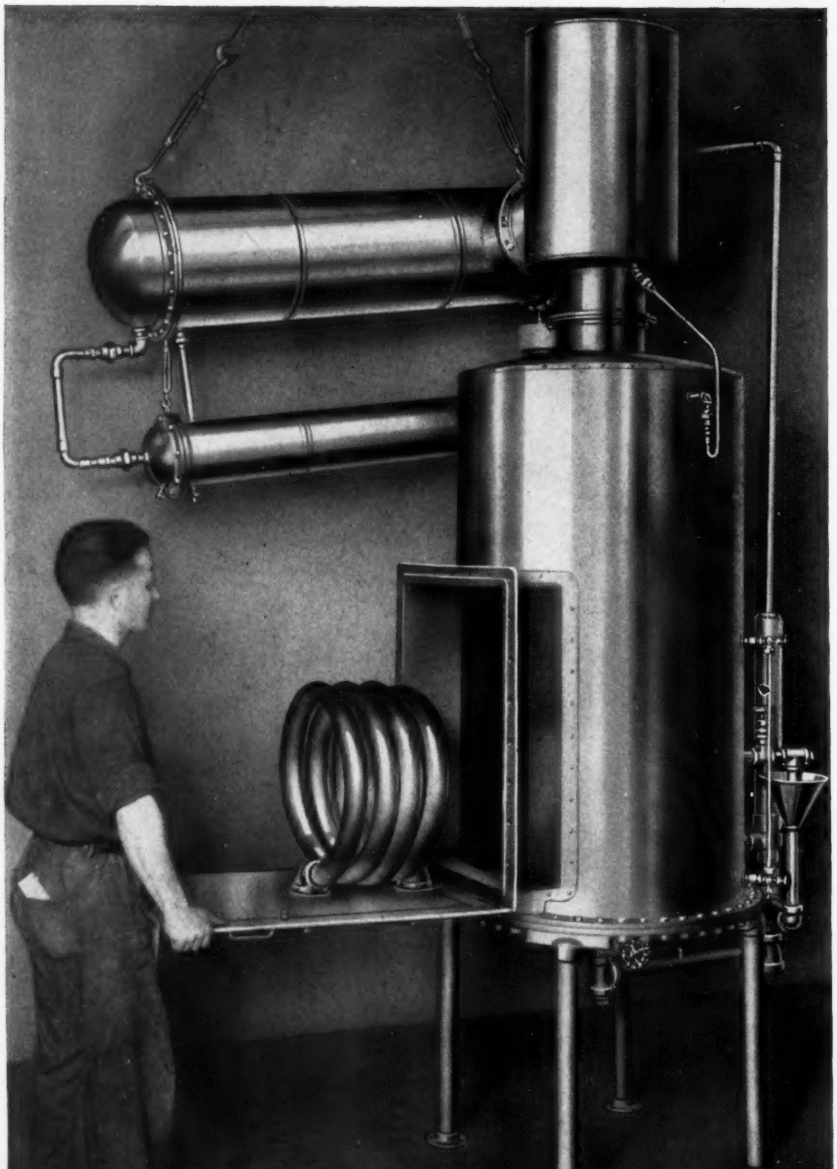

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Editorial

keep the well **FLOWING**

by ROBERT L. TAYLOR, editor

TECHNICAL BRAINS are not officially listed among the critical raw materials of this country. Unlike copper, tin, and aluminum, there is no requirement that they must be used sparingly and only where nothing else will do. One would gather from this that the supply is limited. But it is not. In fact, there is not even a guarantee that the flow of new supplies from colleges and universities will be maintained at all beyond 1945.

Strangely, this seems to be the situation today regarding one of the most valuable national assets of this industrial nation of ours. Technical brains rank along with abundant physical resources as uppermost among this country's contributions to a United Nations victory. Likewise they will render important assistance in postwar reconstruction and in providing jobs for returning soldiers and sailors. Yet there is dangerously inadequate provision for maintaining the flow of this essential resource into industry.

At present all college students, except those in engineering who receive certification from their school that they are far enough along to obtain their degrees within 24 months, are being inducted into military service when they reach age eighteen. Some of these may then be assigned back to the Army A-12 or Navy V-12 specialized training programs, which consist of accelerated engineering curricula specially adapted to Army and Navy needs. Even these programs, however, have eliminated chemical engineering as a field of specialization on the ground that there is not much need for chemical engineers in the services. So industry cannot even look to this source as a postwar stop-gap provider of chemical technical men.

WHAT IS HAPPENING to chemical engineering enrollment and chemical engineering faculties under these conditions is indicated by a survey of 79 colleges and universities currently completed by the American Institute of Chemical Engineers. One faculty head reported, "There is every indication that the civilian program will shortly be reduced to such low numbers that we cannot afford to operate civilian sections." Others said that faculties had been reduced and staff members loaned to other departments. Still another gave the following illuminating figures on freshman enrollment in chemical engineering at his school:

Freshmen coming in but subject to draft

1943-44	18
1942-43	74
1941-42	54
1940-41	54
1939-40	49

This seems to be typical—not an exception. Summarized, the survey indicates that the number of new bachelors of science in chemical engineering over the next twelve months will total only about 1,000, or one-third the number of last year. Of these, the proportion who will enter the armed forces and thus be unavailable to industry is highly uncertain. It will undoubtedly be appreciable, however, despite reports from most schools of one to six job offers per graduate. The outlook for 1945 is indicated as even darker, regardless of whether or not the war ends in the meantime.

OVER THE PAST FIVE YEARS, industry has required an average of 2,000 new chemical engineering graduates and several thousand chemists per year. It seems extremely unfortunate and shortsighted that this stream should be virtually shut off at a time when there will be special need for it. In our opinion the weight of evidence is far on the side of more—not fewer—chemists and chemical engineers needed by industry in the years immediately following the war.

One thing that makes us think this is that there will be an abnormally high rate of retirement during these years among men who would have retired earlier but stuck at their posts for the duration. This will require extensive upgrading in many cases, with resultant openings at the bottom. That such a movement is already beginning in a few companies is perceptible as the war approaches its final phase.

AND THEN THERE IS EVIDENCE that chemical companies have a sizable accumulation of peacetime developmental projects on their shelves awaiting the manpower to carry them out—dormant, partially completed projects of prewar origin and new projects that have been suggested in the course of war work. That companies are thinking about these projects in

terms of hard cash outlay has been rather convincingly indicated in a survey of estimated postwar equipment needs of the chemical industry recently made by this magazine. Complete returns have not yet been tabulated, but the indicated total dollar volume of such needs is substantial.

Not to be overlooked is the generally agreed fact that the war has provided nuclei for several great new chemical consuming industries of potentially mammoth proportions. These will keep at least some of the war-expanded chemical producing facilities going at full tilt, if not more so. The rise of impregnated plywood and plastics, the demise of silk and the probable permanent partial replacement of natural rubber all have the markings of vast new giants with ever-increasing appetites for chemicals.

Closely allied to this is the awakening of many more managements in the process industries to the value—or necessity—of adding chemists and chemical engineers to their staffs. Even companies in more distant fields are finding need for chemically trained men. As short a time as five years ago it would have been considered slightly crazy to take a chemical engineering professor and make him director of research of one of the country's largest airplane manufacturing companies. Yet that is what happened last year to the author of one of the articles in this issue.

OFFSETTING TO SOME EXTENT this plus side of the ledger of postwar demand for chemically trained men is the uncertain status of a large portion of present synthetic rubber capacity and the certain release of chemical men from the munitions industry and some of the CWS and DPC plants. There will also be some chemists and chemical engineers returning from the armed forces.

All things considered, however, there seems to us little doubt that more instead of fewer chemists and chemical engineers will be needed in 1945 and 1946. It hardly seems the part of wisdom now to cut off that supply in order to gain 5,000 additional troops. Industry and colleges will be serving the best interests of the nation by encouraging enrollment of freshmen in the civilian chemical and chemical engineering curricula and urging deferment from military service for those who do.

Penalty On Progress

THE PROPOSAL recently put forth by the Treasury Department that research and development expenditures leading to a patent should be capitalized as an asset and amortized over the life of the patent rather than charged off annually as an operating expense is both unfair and unwise.

It is unfair in that it comes at a time when tax rates are probably at a peak and deductions consequently are more valuable than they will be later when tax rates presumably will be lower. It is unwise in that it will appreciably deplete working capital in the case of many companies with large research programs by causing larger sums to be paid to government in the form of excess profits taxes.

Coming at this time, the Treasury recommendation is in effect a proposal for taxation of research. There are few better or more direct ways of throttling technological progress in industry. We do not know whether or not there is any significance in the fact that this move follows so closely on the heels of the ill-famed Kilgore Bill, but irregardless we believe that it contains a most serious implication for the future of the American chemical industry and, incidentally, for the future of the coffers of the United States Treasury itself. If increased tax revenue is necessary, let it be obtained in a way that will not jeopardize the whole future of scientific and industrial progress.

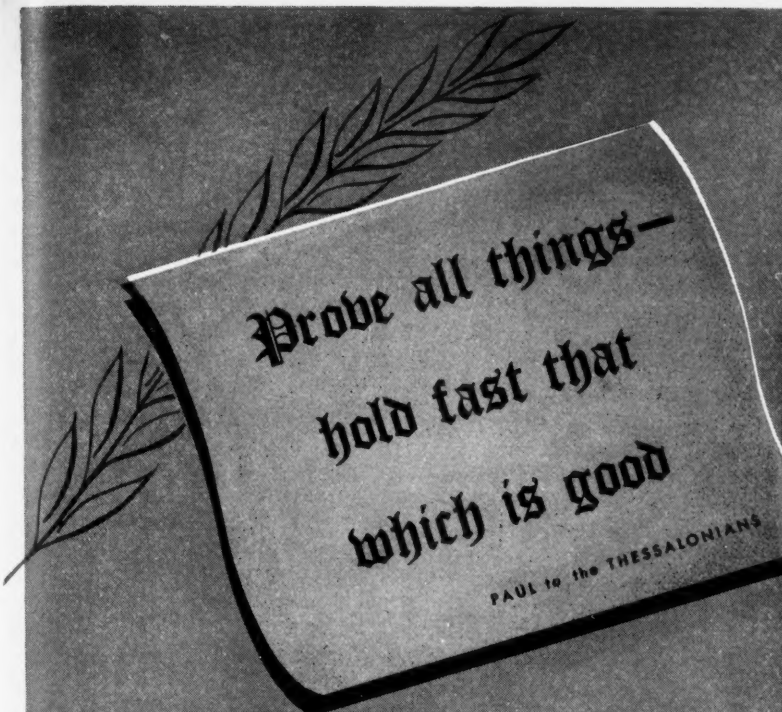
Your New "Chemical Industries"

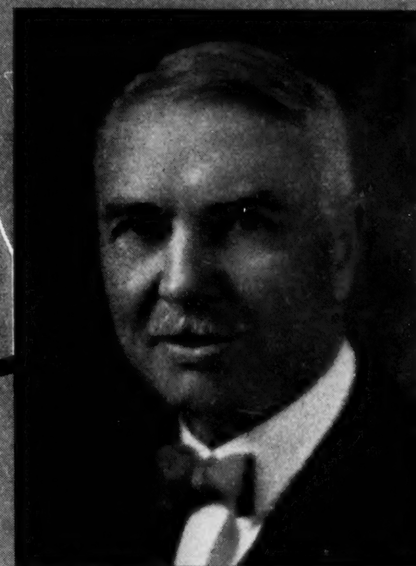
WITH THIS ISSUE you see us in a new suit. From front cover to patent supplement, CHEMICAL INDUSTRIES has been redesigned to give you quickly and in a more attractive and convenient form all of the latest news, developments and comment pertaining to chemicals and chemical industry.

You may have noticed also over the past several months that we have been running an increased number of articles. We are making a special effort not only to bring you more information in these troublesome days, but through a program of broader coverage and greater selectivity to make that information more timely and more authoritative. We call your attention especially to the article on page 656 of this issue which presents for the first time the WPB Chemical Division's estimates of chemicals production in 1943.

Projecting this new program into 1944, we have in store a number of timely articles and special projects, among which will be a series on new postwar markets for chemicals, a problem of concern to everyone engaged in chemical industry. Long range planning and disposition of postwar chemical surpluses are problems that will be examined in detail. At the same time we are planning a comprehensive series on the everyday problems of chemical plant management and operation. As in the past, descriptions of new chemicals and new processes will continue to be brought to you as they appear. The appointment announced elsewhere in this issue of T. Pat Callahan, supervisor of containers for Monsanto Chemical Company, as editor of our packaging and shipping section, brings to CHEMICAL INDUSTRIES readers the experience and comment of one of the leading authorities on chemical packaging in the country.

All together, we believe we have an unusually attractive and worthwhile program in store that will help producers and users of chemicals to do a better job in 1944.





A Philosophy for CHEMICAL PROGRESS

by ALFRED H. WHITE · *Professor Emeritus of Chemical Engineering* · *University of Michigan*

Photo courtesy Michigan Alumnus

YOU HAVE ASKED me to look back over a professional life of half a century and try to formulate a philosophy for chemical progress. There is no doubt about the extraordinary chemical progress which our country has made, but the underlying philosophy is not quite so evident.

Half a century ago when I graduated from college, the United States was producing only a quarter of a ton of aluminum per day, and there were doubts as to whether the metal would ever become of major commercial importance. Less than a million tons of basic open hearth steel were manufactured that year compared with 73 million tons in 1941. Less than 600,000 tons of Portland cement were made in the United States, not even one-half of one per cent of the present annual production. The main product of the petroleum refineries was "refined oil for illuminating purposes," that is, kerosene oil for lamps. The demand for bleaching powder was reported heavy because of fear of recurrence of a cholera epidemic in the next few months. The manufacture of synthetic chemicals was almost non-existent anywhere in the world in 1893 except for a mere beginning of the dye industry.

Chemical engineers were unknown, and professional chemists were so few that the American Chemical Society had only 460 members in 1893 although the society had been in existence for seventeen years. The major part of the professional training of a chemist was in analytical chemistry because that was the field where most of his activities would lie in his industrial work. Some attention was given to organic chemistry and organic analysis. Nernst, Van't Hoff, Le Chatelier, Gibbs and others were publishing their researches mostly in foreign languages, but no organized statement of their work had been brought together, and physical chemistry as an organized body of knowledge or as a course in college was non-existent.

I graduated as a chemist with the firm conviction that if an equation could be written and made to balance, then it went from left to right completely. The word equilibrium was never heard in any of my college courses. In the course in qualitative analysis, it was stated that aluminum hydroxide was precipitated from a solution on addition of ammonia and that the precipitate redissolved in excess of that reagent. If the query was raised as to what constituted an excess, the proper reply was one molecule of ammonia more

ALFRED HOLMES WHITE retired as head of the department of chemical and metallurgical engineering at the University of Michigan last year after a long and distinguished career in that position. Because he is one of them himself, he has known intimately many of the pioneers and leaders in modern chemistry and chemical engineering. He presents here a philosophy that is the result of 50 years of observation and experience.

than the theoretical amount required to precipitate the hydroxide completely.

In physics the general college course included mechanics, heat, sound, light and a little electricity, all treated descriptively. A well-known professor of physics told his classes that physics was an almost completely developed science and he doubted whether there would ever be changes in it beyond perhaps an alteration in the fourth decimal place of some of the physical constants.

The pioneering spirit of our country had received a great impetus from the development of the Bessemer steel process, which for the first time gave the engineer steel in large quantities at a reasonable price. The great era of railroad building and development of the country west of the Mississippi River which started after our Civil War had brought our country to first place as an industrial nation, Great Britain having been surpassed a little over fifty years ago. It was an era dominated by men of energy and ability but little scientific education, like Andrew Carnegie, John D. Rockefeller and Jay Gould, who dared to take risks in large scale developments which promoted rapid expansion of our new country. The rotary cement kiln was a United States development which was initiated about that time. The petroleum industry had made great progress in methods of drilling wells and of transporting oil but had done relatively little to improve refining operations except to increase the size of the stills. The chemical industry remained relatively dormant during the rapid expansion of the metallurgical and construction industries. This was partly due to the dependence on Great Britain for all but the cheap and heavy chemicals on which the ocean freight was an important item.

It was not until this period of about fifty years ago that chemistry reached the state where it could be of great service to industry. The analytical chemist in his laboratory developed methods for determination of chemical composition but he did little to help the manufacturer solve his industrial problems. It was not until physical chemistry was developed to a point where it could prophesy the effects of changing conditions, and until chemical engineering reached the stage where it was able to control reactions by proper design and operation of equipment that the chemical industries commenced to reach out beyond empirical methods and begin creative work. Since both physical chemistry and chemical engineering have been developments of the past half century, it has necessarily been within this period that we have had the wonderful expansion of the chemical industry.

Traditionalism pervaded the chemical industries of this country as well as Europe. Secrecy was the general rule, and the skilled workman who had worked his way up from an apprentice was the supreme authority as to the process. The chemist was looked upon with suspicion as one who wished to pry into cherished secrets, and his attempts to introduce scientific methods were bitterly resented.

One of our foremost American tanners told me this story about himself. His father's family had been tanners in Germany for generations and when the father moved to this country he carried with him the secrets of the family and started a tannery in this country. The son born in this country received more education than his parents but worked as a boy in the tannery so that he became a competent tanner. When he became twenty-one, his parents sent him to Germany to visit the grandparents and one day the grandfather took him aside and said, "Henry, you are now a man and will soon be succeeding your father in the tannery and so I am going to disclose to you the ancestral secret of our tanning process which you in turn must keep in complete secrecy." The young man promised and received the secret which, he told me, he did not regard very highly because he could not see that it had brought prosperity to his family. He returned to his home and in a few years, as his grandfather had prophesied, he assumed greater responsibility in the management of the tannery. He also started to experiment on modifications of the process and gradually introduced improvements without telling his father what he was doing. This was easy because the father's health had failed so much that he rarely visited the tannery. One day, however, he did notice something different and called the son to account. Henry explained that he had been studying and experimenting and had found some improvements in their process. The father was furious, not because the son had not asked his permission, but because the son had dared to assume that he could improve on the family tradition.

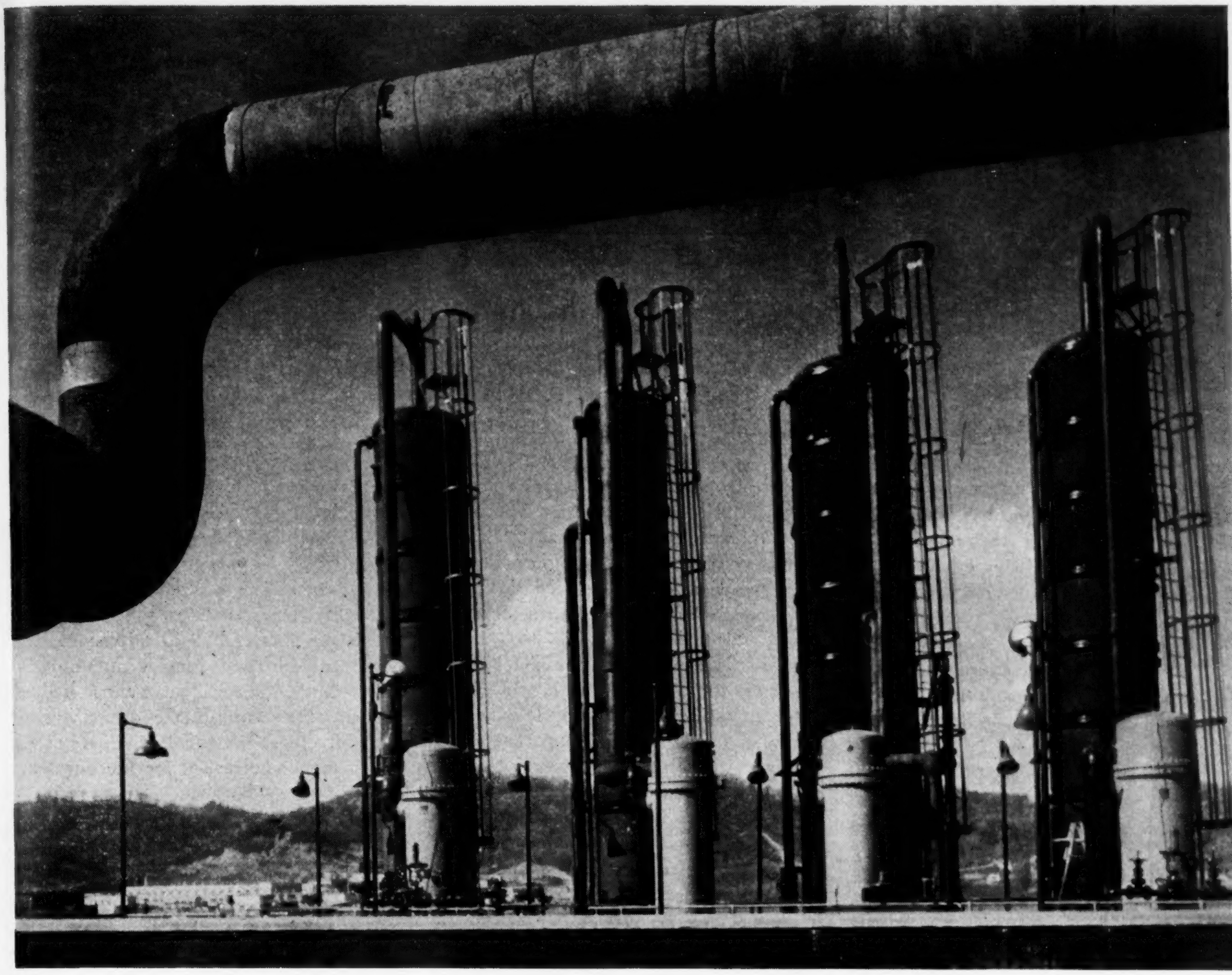
This incident took place less than fifty years ago but the influence of traditionalism lasted for many more years. During the last World War in 1918, one of our large chemical companies employed to design, construct, and operate a munitions plant owned by the United States government, wrote a bitter letter to the Chief of Ordnance because some of the government chemists and chemical engineers were making reports to their superior officers which suggested that improvements might be possible in design and operation of that plant which, experience later showed, had been designed and built without any adequate research or development program.

The Germans were the first to sense the value of scientific developments in the chemical industries, and they craftily used their success in this field to dominate the world's markets. The great German chemical companies operating under government supervision stifled American competition by organizing subsidiaries, nominally American, to manufacture the cheap chemicals used in large quantities in this country and to distribute the finer chemicals imported from Germany. The American pioneering spirit which developed our railroads and our steel, automotive and electrical industries was smothered in chemical fields by the German organization. Only a few courageous and skillful individuals like H. H. Dow were able to stand against it. I remember he once told me that in their effort to drive him out of business in the earlier days when potassium bromide was his principal product, the Germans cut the price of that chemical until the imported bromide sold in New York for less than the duty which was charged to bring it into this country.

The first World War abruptly cut the apron strings which had tied our chemical industry to Germany. We not only had to learn to manufacture the finer chemicals and dyes whose manufacture had never been undertaken in this country, but we had also to simultaneously create great plants to provide munitions of war. The people of the United States became for the first time conscious of the importance of the chemical industry. When the war ended, traditionalism had been relegated to the waste basket and a new and dynamic chemical industry was being developed.

A more recent development has been the realization that individual companies may profit by exchanging information with competitors. I still remember my surprise about twenty years ago when the manager of a paper company told me he was going to lead a discussion on cost accounting at a national meeting and was going to illustrate it by graphs of actual cost at his own plant. His explanation was that he was sure some of his competitors were so unaware of their costs that they were selling certain items at a loss without knowing it, and that if he could get them to install cost systems they would be better off and he also would profit because he knew what items he could make more economically than his competitors. Still more recently I sat in the office of the development manager of one of the large rubber companies in Akron and heard him say that they had abandoned their policy of secrecy and were exchanging information with their competitors because they felt that the way to improve business for everybody was to build better and cheaper tires, and thus widen the market for automobiles and for tires.

The brilliant success of our present developments in synthetic rubber and high



Butadiene distillation towers at Institute, W. Va.—another triumph for chemical industry.

octane motor fuel shows how rapid progress can be made when there is complete and wholehearted cooperation between companies working for the common good.

One other necessity for chemical progress is incentive—a commensurate reward for great achievements. Such a reward has been traditional in our free American democracy, and it spurred Thomas Edison and Henry Ford and Herbert Dow to use their talents freely and do great things for their fellow citizens. That incentive has been greatly limited during the last decade by legislation and government action. It would be difficult for either of those three men if they were starting under present restrictions to build up the great enterprises which they founded in a past generation. The encouragement of free enterprise and a great incentive looms large in any philosophy for chemical progress.

The modern viewpoint of incentive for the younger workers is exemplified by the statement which the vice-president of one of our large modern chemical corporations made to me about his attitude toward young engineers. "When I put a new man in the plant," he told me, "I tell him he is going to stay on that job a longer time than he may think necessary, because I want him not only to learn to do the job as well as it has been done before, but I want him to improve on the earlier procedure." Such an attitude is a great incentive to enthusiasm and progress.

We are, all of us, products of our inheritance, of our environment and of our own efforts. The chemical industry has also been influenced by these same factors. Even thirty years ago its past was rather uninspiring and its youth was slow and conventional. The first World War released it from the fetters of Germany and aroused it to its possibilities. Since that time it has steadily and aggressively pushed forward, utilizing the achievements of science and technology, fostering research and in ever increasing measure, cooperating with all agencies for the common good.

From a scientific standpoint the tremendous expansion of our chemical industries in the last half century has been due to two major new influences. One has been the development of science to the place where the chemist, the physicist and the chemical engineer have been able to work effectively. The second has been the recognition by management that this scientific knowledge should govern plant operation and that empiricism and traditionalism should be discarded for the new and firmer basis.

To ensure continued progress in the complicated postwar world, these factors should be appraised and used advantageously by all companies large and small. There must be cooperation in research and in interchanging knowledge the dissemination of which will ultimately be for the common good. There must be adequate reward for initiative both for the individual and the corporation.

This philosophy for chemical progress has been understood and practiced for a good many years by our more progressive chemical corporations and it is through its application that the wonderful advances of our present era have been made. The continuance of this philosophy will result in further advances at an accelerated tempo. It is not a new philosophy. It can be expressed in almost the identical words of the apostle Paul when he wrote to the Thessalonians—"Prove all things, hold fast that which is good."

U. S. Production of Chemicals in 1943

The 1943 Record of Chemical Industry's Accomplishment Is a Prologue to Bigger Things In 1944

by MELVIN E. CLARK and FRANK TALBOT
Chief and Deputy Chief, Program Section, Chemicals Division, W. P. B.

WAR SETS a fast pace for America's chemical plants. This year's production will more than double the peacetime record of 1939 for the chemical manufacturing industry and will show tremendous gains in those allied products industries which consume chemicals. For 1944 the outlook is vague. The fortunes of the chemical industry are tied up with the fortunes of war. At this time a complete introduction to 1944 cannot be written because the 1943 returns are not in. However, even if the year had been completed, the picture would still be blurred by wartime censorship. Inevitably, the most impressive accomplishments are those whose announcement would give most aid (but least comfort) to the enemy. Therefore, the portrait of chemical industry in 1943 must be painted with a broad brush. It cannot be shown in hard and fast Government statistics, but must be judged from an individual vantage point by sweeping estimates of the relative magnitude of various operations which can easily be refined as more data and more time for analysis become available in ensuing months.

Our estimates place the dollar value of output of chemicals and allied products at 7,500 million dollars in 1943 as compared with 3,700 million dollars in 1939, an increase of 102%. Included in these totals are the values of output for the chemical manufacturing industry which increased from 790 million dollars in 1939 to 2,200 million dollars in 1943, a gain of 180% in four years.

Of course, these ratios are not an accurate measure of the real productive accomplishment of the industries because 1943 prices are generally higher than in 1939. The gain in prices for chemical products is probably not as great as in many industries for the reasons that larger scale production has resulted in lower costs and the industry has in many cases supplied its own raw material from mineral and petroleum sources. The largest increases in price have appeared in those cases where the raw material was derived from agricultural sources (e.g. alcohol and its derivatives). According to the Bureau of Labor Statistics, chemical prices have increased 15% while chemical and allied products prices have increased 35%. For our purposes the 15% seems a reasonable "deflation" factor and reduces the gain in chemical manufacturing from 180% to 140%. However, the price differential for allied products seems unduly high. Undoubtedly, it is heavily weighted with the highly inflated prices of imported drugs and oils. Since this value does not represent domestic manufacturing, it should be discounted. For the purpose of this discussion, inflation in prices of chemicals and allied products will be estimated at 15%, which means that the net increase in production is only 75% instead of 102%.

Even after deflation the industry's production record is outstanding. It has been accomplished only by a considerable increase in manufacturing facilities. It is estimated the total value of chemical plant expansion completed in the four years ending with 1943 will have been between 1,150 and 1,200 million dollars or about 80% of the 1,450 million dollar program approved to date. This figure includes the cost of chemical plants built as a part of the synthetic rubber program (butadiene, styrene, neoprene and catalyst); it includes chemical plants built by Army Ordnance and Chemical Warfare except where such plants are part of an integrated operation such as oleum plants at explosives works; it includes plants built by Defense Plant Corp. and private firms under authorization of WPB; it includes a minor amount of new construction completed without priorities early in 1940. Unofficial estimates showing the magnitude of various programs for expansion of chemical war industrial facilities are shown in Table I.

It should be emphasized that these figures *do not* include chemical consuming plants such as military explosives, chemical warfare gas plants and bomb filling lines, etc.

Though official statements earlier this year indicated that chemical construction was "over the hump," it should not be concluded that expansion is over for the duration. Even after completion of the 250-300 million dollars worth of plants which will be unfinished on January 1, 1944, there will be additional construction. Currently new facilities are being approved at a rate of 8-10 million dollars per month. They provide for adjustments in the chemical program based on combat experience of the armed forces and for those essential civilian needs which cannot be denied for the duration.

Table I—Estimated[1] Value of Chemical Plant Expansion Since 1939 as Currently Programmed. (October 1943.)

Sponsoring Program	Cost Millions of dollars	% Complete End of 1943	% Government Financed
Synthetic Rubber	450	75	95+
Military Explosives	350	95+	85
Chemical Warfare	30	100	100
Chemicals[2]	620	80	20
Total	1,450	81	65

[1] Not official statistics but the authors' estimates of approximate order of magnitude.

[2] Includes "Allied Products" except rayon. Expansion for allied products was small in proportion to the total.

A discussion of the necessity for new facilities would comprise an article in itself.

To give proper emphasis to the chemical construction program, some figures on the overall program are relevant. War industrial facilities in manufacturing and mining industries initiated since early 1940 total almost 20 billion dollars (of which 80% is government financed). Over three-quarters of this huge program will be completed by the end of 1943. Some of the remainder is held in abeyance or has been cancelled, but most of it is expected to be completed during 1944. It has been estimated by L. W. Chawner (formerly of the Bureau of Foreign and Domestic Commerce) that the total value in place of industrial facilities at the end of 1939 was 60 billion dollars. On that basis the construction program would represent a 25% plant expansion by the end of 1943. However, the Statistics of

Income for 1939 show gross tangible capital assets for all manufacturing as only 37.7 billion dollars. Chemicals and allied products accounts for 2.8 billion dollars of this amount, which indicates that the industry owned about 7½% of all facilities at that time. Estimates above indicate that the industry has constructed 8% of the new facilities built in the 4-year period. Considering the tremendous increases in aircraft and shipbuilding, that is a fair share of the total. The chemical manufacturing industry alone would show a much larger percentage gain because many of the "allied products" industries constructed no new facilities.

Chemicals

When we look behind the totals to see what products accounted for the increase of almost one and a half billion dollars in output of chemicals, we find the following relationship between the various components of the industry:

Table II—Estimated Value of Output of Chemical Manufacturing Industries for 1943 as Compared with 1939. (Millions of Dollars.)

Industry	1939	1943	Per cent Increase
Organic Chemicals			
Coal-Tar Crudes and Intermediates	73	290	300
Coal-Tar Finished Products	106	200	89
Non-coal-tar synthetic	173	640	270
Non-coal-tar other	25	200	700
Inorganic Chemicals	413	880	112
Totals	790	2,210	180

The gain of 270% shown by non-coal-tar synthetic organic chemicals is a continuation of the uptrend of several years. This figure includes production of butadiene for the synthetic rubber program and methanol and other organic chemicals produced in Ordnance plants. It does not include production of synthetic rubber in government plants. The rate of increase in production during 1943 can be judged from Table IV showing the sales of certain companies increasing from 100 million dollars in the first quarter to 135 million dollars in the fourth quarter. This will indicate that 1944 will again show large increases for this segment of the industry.

That part of the chemical industry usually designated as coal-tar organics chalked up important gains, but it was evident that the name would have to be changed because a considerable volume of toluene, styrene, and other chemicals were of petroleum rather than coal-tar origin. It is probable that future Tariff Commission reports will designate the class as "cyclic organic" chemicals. Production at Ordnance plants accounted for a large portion of the increase shown by this industry. It is mainly because of toluene production that crudes and intermediates showed a greater gain than finished products. However, further refining of motor benzol allowed it to command higher prices and raise the output value of this item. Intermediates production was increased all along the line with greatest gains shown in phenol and phthalic anhydride.

Finished products consist of dyes, rubber chemicals, and miscellaneous products. Gains in dyes (estimated at 103 million dollars) were not as spectacular as in other parts of the industry. Raw materials were hard to get except for military orders. Soldiers' uniforms required an important segment of the total supply.

The item "non-coal-tar organic chemicals other than synthetic" consists almost entirely of alcohol by fermentation. Because of the unusually large increase

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HERE FOR THE FIRST TIME is a statistical breakdown of the stupendous job of war production that is being done by our chemical manufacturing industries today. These estimates by the Chemicals Division of the War Production Board show a 180 per cent increase for 1943 over 1939 in value of output of chemicals. Virtually all branches of the industry have participated in the gain.

* * * * * * * * *

in unit value in this industry (over 100%) the value figures show an entirely erroneous ratio of increased production. The distilled beverage industry, with technical advice and assistance from industrial alcohol producers, converted its plants to alcohol manufacture to make this increase possible. If to the dollar value of distilled beverage production in 1939 (105 million dollars) were added the cost of converting an equivalent quantity of high wines to industrial alcohol, and the inflation in alcohol price were discounted, the sum of these items would show a decline for 1943.

It may come as a surprise to some readers that inorganic chemicals increased in output during the four years as much as 112%. Actually production may have increased more because expansion of several basic items, notably sulfuric acid, chlorine, caustic soda and ammonia, was accomplished largely in consuming plants, thus making no contribution to value of output as calculated here. The unusual demand for basic chemicals by the explosives and chemical warfare programs as well as abnormal industrial growth, such as in the manufacture of the organic chemicals referred to above, accounted for the expansion in this group.

Claimant Programs

The stimulus for the chemical industry's tremendous increase in output has come almost entirely from two sources—(1) wartime growth in normal industrial markets, particularly the "Allied Products" industries discussed below, and (2) major construction programs for facilities to produce war material. Those programs of particular interest to the chemical industry are:

(1) *Synthetic Rubber*, which has been largely responsible for the 175-million dollar gain in alcohol production and entirely responsible for large scale expansion of butadiene, styrene, carbon black and other rubber raw materials. Consumption of chemicals has not yet reached peak rate because the Rubber Director's 700-million dollar plant expansion program will be only about three-quarters completed by the end of 1943. An earlier table showed that two-thirds of this expansion consisted of chemical plants, but these alone were not sufficient to supply all chemical raw materials.

(2) *Military Explosives*, which has increased the 1939 ammonia and toluene output manyfold and necessitated important plant expansion in methanol, sulfuric acid, etc. The Ordnance construction program, involving nearly one and a half billion dollars worth of plants that use up chemicals, is virtually complete and it is probable that chemical consumption is near the peak scheduled rate. If the value of products produced by this new industry were added to our "Allied Products" group, they would swell the total by more than one-half billion dollars in 1943.

(3) *Chemical Warfare*, which has placed huge demands on our production of chlorine, phosphorus, arsenic, acetic acid and other basic chemicals mainly through purchase of derivatives of these chemicals used largely for smoke screens and protective clothing. It should be pointed out that the quantities of chemicals made into war gases are extremely small in the overall picture and therefore the use of gas warfare in itself will not cause a major shift in chemical production. The CWS construction program has involved less than 150 million dollars worth of chemical consuming plant and is now virtually completed.

(4) *Aviation Gasoline*, a plant construction program which will have cost more than three-quarters of a billion dollars when completed, but a substantial portion of which will not be finished this year. Petroleum refineries have called upon chemical producers for additional

production of chemical additives for gasoline and lubricating oils. Large increases in benzene, tetraethyl lead and its raw materials, sulfuric acid alkylates, aluminum chloride, hydrofluoric acid, special fluid flow catalysts and other raw materials have resulted.

These programs alone account for more than 3 billion dollars worth of new facilities to chew up our supplies of chemicals. Additional claims came from the "Allied Products" industries.

Allied Products

The industries selected for this presentation are not entirely coincident with the industries included in Group 9 of the 1939 Census of Manufacturers. The classifications shown in Table III were chosen because they conform quite closely to the industries served by the Chemicals Division of the War Production Board. The Division is not responsible for distribution of all products produced by these industries, but is responsible for supplying priority assistance on maintenance materials and operating supplies to keep the chemical parts of these plants in operation. Estimates for the selected allied industries for 1943 are based on one or more of the following types of data: (a) Estimated tonnage of products produced multiplied by current average unit sales price in carload lots f.o.b. producing plant; (b) estimated consumption of chemical raw materials as related to consumption in past years and adjusted for price changes; (c) estimates of sales volume by principal producers adjusted to cover the entire industry. Most of the research time spent on these estimates concerned the large volume items; therefore, the smaller items are likely to contain a higher percentage of error, but the weight of this error in the total is correspondingly small. Developments in selected classifications are described in the following paragraphs:

Table III—Value of Output[1] for Chemical and Allied Products Industries Estimated for 1943 as Compared with Census Data for 1939. (Millions of Dollars.)

Industry	1939 (Census)	1943 (Estimated)	Items Included
Chemicals			
Acetates	22.9	55.0	Butyl, ethyl, lead, sodium, etc.
Acetone	2.9	*	
Acids	82.3	187.0	Acetic acid and anhydride, boric, hydrochloric, hydrofluoric, nitric, phosphoric, sulfuric, tartaric, etc.
Alcohols	40.6	246.0	Ethyl, butyl, methyl, etc.
Ammonia	9.9	*	
Bicarbonates and carbonates	42.3	93.0	Sodium, calcium, magnesium, etc.
Bromides	9.5	*	
Bromine	0.5	0	
Calcium carbide	8.5	*	
Carbon, activated	1.9	*	
Carbon bisulfide	5.2	*	
Carbon tetrachloride	3.3	*	
Chlorides other than sodium	18.8	*	
Chlorine	10.5	*	
Chlorine bleaching compounds	12.00	*	
Chromates and bichromates	6.8	*	
Citrates	0.9	*	
Cyanides	4.1	*	
Ester gum	1.8	*	
Ether, ethyl	1.4	*	
Fluorides (except carbon)	1.8	*	
Hydroxides	37.6	50.0	Sodium, potassium, etc.
Iodides	1.2	*	
Iodine	0.5	*	
Modified sodas	1.3	*	
Nitrates, except sodium	8.9	*	
Oxides	10.1	16.5	Antimony, magnesium, chromium, mercury, tin, etc.
Peroxides	4.4	1.1	Hydrogen, etc.
Phosphates	20.1	43.0	All sodium and calcium, others.
Salicylates	0.6	*	
Sodium salts, n.e.c.	2.8	*	
Sodium silicates	9.2	14.0	Liquid, solid (meta, ortho, sesqui).
Stearates	1.4	4.3	Aluminum, zinc, etc.
Sulfates	22.9	41.0	Aluminum, copper, magnesium, sodium, etc.
Sulfides	2.3	4.0	Sodium, etc.
Sulfites	5.2	13.0	Sodium hydro, zinc hydro, etc.
Sulfur dioxide	1.3	*	
Sulfur, refined	3.4	*	
Tartrates	1.4	1.8	Potassium bitartrate, etc.
Misc. small items	2.1	5.0	Bismuth compounds, lactates, alumina hydrate, linoleates, ammoniated mercury, oxalates, etc.
Coal-tar products, crude and intermediate	73.4	290.0	Benzene, toluene, naphthalene, creosote, pyridine, cresylic acid, aniline, phenol, chlorobenzenes, nitrobenzenes, etc.
Coal-tar products, finished	105.5	200.0	Dyes, flavorings and perfumes, rubber chemicals, etc.
Other inorganic	70.4	150.0	Calcined alumina, sodium nitrate, sodium borate, yellow phosphorus, sodium metal, calcium molybdate, etc.[3]
Other organic	116.5	460.0	Tetraethyllead, tetrachlorethane, nitrocellulose not plastic, ethylene glycol, formaldehyde, neoprene, trichlorethylene, and other synthetic organic compounds.
*Items in 1943 not shown separately	[2](124.2)	336.3	
Total chemicals	790.4	2,209.9	

(Continued on next page)

Blacks—Expansion of furnace and channel type carbon black for the synthetic rubber industry has required construction of 8 million dollars worth of new facilities, most of it in the past two years.

Chemical Cotton Pulp—Requirements of smokeless powder, rayon and plastics programs have been met not by construction of entirely new plants but by modest expansion of existing facilities and curtailment of less essential uses.

Coated Fabrics—Quartermaster requirements for waterproof and flameproof tentage and apparel combined with Ordnance requirements for seat coverings and similar types of artificial leather and other coated fabrics have caused the tremendous increase in output shown in the table. An important consideration in this industry has been the increased use of synthetic resin base materials for coating purposes.

Compressed and Liquefied Gases—Oxygen expansion has been the largest factor in the 100-million dollar gain in production and continues to account for a large portion of the dollar value of products in this industry. Expansion of manufacturing facilities was stimulated largely by increased requirements for oxy-acetylene welding and cutting at shipyards, aircraft plants, steel mills, tank arsenals, and other war production plants.

Cosmetics—A surprising gain in dollar output was recorded for this industry in spite of the scarcity of critical raw materials and containers normally used. The market potential for cosmetics is enor-

mous, and manufacturers have shown amazing ingenuity in the substitution for critical materials. Shortage of some types of apparel have increased the market for new types of cosmetics—particularly women's simulated stockings. Another contributory influence may be traced to the new markets created among new womanpower in industry.

The War Production Board policy has been to allow cosmetics producers a portion of scarce materials only after all essential war requirements have been adequately served. Thus when the producers were allowed no castor oil, they made lipstick without castor oil; when glycerine was denied, they substituted propylene glycol; when ethyl alcohol allowances were cut in half, they kept up production with isopropyl alcohol; when critical types of talc were no longer available, they developed a satisfactory product from grades of talc not suitable for war production.

Drugs, Pharmaceutical and Medicinal Chemicals—Development in this field has been considerable because of greatly increased demand upon American industry by Lend-Lease and exports as well as military demand. It has centered about a number of individual expansion programs, notably the following: (a) production of synthetic drugs to replace natural antimalarials no longer available; (b) large scale production of vitamins; (c) increased production of sulfonamide drugs; (d) development and construction of entirely new plants for manufacture of penicillin, and (e) creation of entirely new production of blood plasma and serum albumin.

Fertilizers—The War Food Administration has sponsored a huge fertilizer program designed to increase the output of America's farms and without the use of additional labor and machinery. Carrying out this program without an extensive expansion of facilities has required an unusual practice in the fertilizer industry of continuing production at peak rate during slack seasons of the year and reorganization of normal distribution channels. Furthermore, it has required large scale use of modified ammonium nitrate as a supplement to imported sodium nitrate.

Paint, Varnish and Lacquer—The anticipated drop in paint and varnish sales due to shortage of solvents and other chemical materials has failed to materialize thus far. Many changes in formulations have been required, but all war and most civilian requirements have been satisfied. The years of research directed toward versatility in raw materials requirements stood the industry in good stead. By and large, producers have been able to adapt their operations quickly and efficiently to new sources of raw materials in place of the solvents and oils normally used.

Plastics and Resins—A phenomenal increase in output is indicated for the plastics materials industry by the jump from 78 to 300 million dollars. This has required an expansion in phenol more than double the 1939 rate, has required increased output of urea, formaldehyde, vinyl chloride and many other ingredients including solvents and plasticizers. It has been assumed that fabrication of plastic products has increased in approximately the same proportion as the manufacture of the plastic materials themselves. Numerous civilian uses of plastics have been denied. Some military requirements, too, have been denied.

Table III (Cont.)—Value of Output for Chemical and Allied Products Industries Estimated for 1943 as Compared with Census Data for 1939.
(Millions of Dollars.)

Industry	1939 (Census)	1943 (Estimated)	Items Included
Allied Products			
Blacks (Bone, carbon, lamp)	14.9	25.0	Carbon (furnace and channel).
Bluing	1.1	1.6	Laundry blue, etc.
Candles	6.6	10.0	
Chemical cotton pulp	[4]30.0	50.0	Not including linters.
Cleaning and polishing preparations	76.8	84.0	Automobile polishes and blackings, as well as cleaning compounds.
Coated fabrics	[4]60.0	200.0	Artificial leather, oilcloth, varnished cambric, cable tape.
Compressed and liquefied gases	58.4	175.0	Oxygen, acetylene, carbon dioxide (gas and solid), hydrogen, etc.
Cosmetics	212.5	412.0	Perfumes, cosmetics, and toilet preparations.
Drugs, pharmaceuticals and medicinals	[5]492.7	934.0	Alkaloids, biologicals, essential oils, etc.
Explosives, industrial	63.7	150.0	Dynamite, nitroglycerin, blasting powder, gunpowder, etc.
Fertilizers	161.9	280.0	Mixed fertilizers, superphosphates, etc.
Glass, flat and tableware	195.1	225.0	
Glue & gelatin	34.4	50.0	Hide, bone, and vegetable glues, edible and inedible gelatin.
Gum naval stores	17.4	22.0	Rosin, turpentine.
Wood naval stores	13.4	28.0	Rosin, turpentine.
Hardwood distillation and charcoal	7.0	8.4	Acetic acid, methyl alcohol, charcoal and other products.
Insecticides	45.7	80.0	Arsenicals, rotenone, pyrethrum, household germicides and fungicides.
Lime	30.0	42.0	Quicklime and hydrated lime.
Matches	25.6	30.0	
Molasses	[4]4.3	18.0	
Mucilage, paste and other adhesives	8.2	40.0	Mucilage, paste, mending cement, sealing wax and other adhesives, except glue and rubber cement.
Paints, varnishes and lacquers	418.4	620.0	Paints, varnishes, lacquers, enamels, drying oils, fillers, putty, shellac, etc.
Phosphate rock	12.3	17.9	
Pigments and colors	113.1	155.0	Lead oxides, lithopone, zinc and titanium pigments, etc. Does not include carbon black, bone black, and lamp black.
Plastics and synthetic resins	78.0	300.0	Nitrocellulose, cellulose acetate, coal-tar resins (in sheets, rods, tubes and molding powder) vinyl resins, methacrylates, non-coal-tar resins.
Plastics products, fabricated	71.9	280.0	Laminated and molded products.
Potash	12.0	26.0	Refined and run-of-the-mine potassium chloride and sulfate.
Printing inks	44.3	42.0	Not including writing ink.
Rayon and allied products	246.0	460.0	Rayon, cellophane, nylon.
Salt (evaporated and rock)	23.0	42.0	
Soap and glycerin	291.9	475.0	Including glycerin refining.
Sulfur, crude	45.5	43.2	Not including refined sulfur.
Total allied products	2,916.1	5,326.1	
Total Chemicals and Allied Products	3,706.5	7,536.0	

* Value in 1943 cannot be shown without disclosing approximate production of an individual product.
[1] Value of output means value of products produced for sale or transfer from producing plant. No value is assigned to chemicals consumed where made.
[2] Not included in totals.
[3] Magnesium metal was included in this category in 1939 but is excluded from the 1943 estimate.
[4] Partially estimated.
[5] The 1939 census figures for drugs, pharmaceuticals and medicinals has been increased by the WPB based on a survey of firms not included in the 1939 census.

Rayon and Allied Products—Statistics on the output of this industry are fairly complete and accurate. The outstanding developments are (a) conversion of existing viscose plants to production of tire cord, (b) construction of additional viscose plants for this purpose, (c) stimulation of additional chemical production to continue capacity operation for acetate plants. The acetate rayon industry will be faced with serious critical raw material problems during the remainder of 1943 and early 1944, but chemical plants now under construction are expected to alleviate this situation by late 1944.

Soap and Glycerin—Despite shortages of fats and oils, this industry has maintained a fairly high level of output, due in part to the appreciable war demands for glycerin.

Conclusion

The record for 1943 when compared with prewar years shows that the chemical industry is doing an outstanding wartime job. The industry has been fortunate because, by and large, it has not needed to convert as large a percentage of its plants from one type of manufacture to another. (By the same token the reconversion problem may not be difficult.) Many of our chemical plants are now war plants although they produce the same products in the same way in the same equipment and sell to the same customers as before the war. However, these customers now may be producing munitions (such as machine guns instead of domestic refrigerators). In such cases the chemical plant is just as much a war plant as the new airplane factory next door.

This principle is generally recognized by chemical plant management, but is not always carefully applied in employee relations. When an employee states that he is leaving the company to work in a war plant, the counter question should be "You mean you want to leave *this* war plant to work in another?" This type of thinking plus a modest educational campaign to show how chemicals are helping to win the war should help in the fight against serious labor shortages that are beginning to hamper production.

Good as the 1943 record is, it is not enough. In 1944 and as long as the war continues, we must strive to increase production. Remembering that chemicals are munitions, we may well ask of any chemical plant manager, "Is your war plant producing all it can?" In most cases the answer will be, "Yes, but we'll find a way to squeeze out more next year."

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Estimated 1943 Production of Chemicals by Quarters

The following table shows the value of the output of certain selected companies manufacturing (1) chemicals and (2) certain groups of allied products. The values shown for the first and second quarters of 1943 are in general actual values, while those for the third and fourth quarters of 1943 are estimates made by the individual companies.

Data obtained from various reports made available to the Chemicals Division by the manufacturers show in a majority of individual cases the values reported in applying for maintenance, repair and operating supplies under Order P-89. In the case of others, information was obtained from PD-25A forms filed earlier in 1943 under the production requirements plan, and for some companies information was obtained from current PD-870 forms. (WPB-2613.)

Companies included in "chemicals" reported a value in the first quarter of 1943 of 302,438 thousand dollars and show an increase in each quarter of that year to 365,678 thousand dollars in the fourth quarter. The total value of production for these chemical companies for the year of 1943 was 1,341,682 thousand dollars. Non-coal-tar synthetics show an increase in value in the fourth quarter of about 35% over that shown for the first quarter of 1943, while coal-tar finished products increased 15%; coal-tar crudes and intermediates, 17%; and inorganic chemicals, 13%.

The total value of allied products shown in this table increased during each quarter of 1943, and for the calendar year totalled 1,835,894 thousand dollars. Increases in value are shown for the fourth quarter as compared with the first quarter for drugs, pharmaceuticals, and medicinals; plastic materials; rayon and allied products; compressed and liquefied gases; and soap.

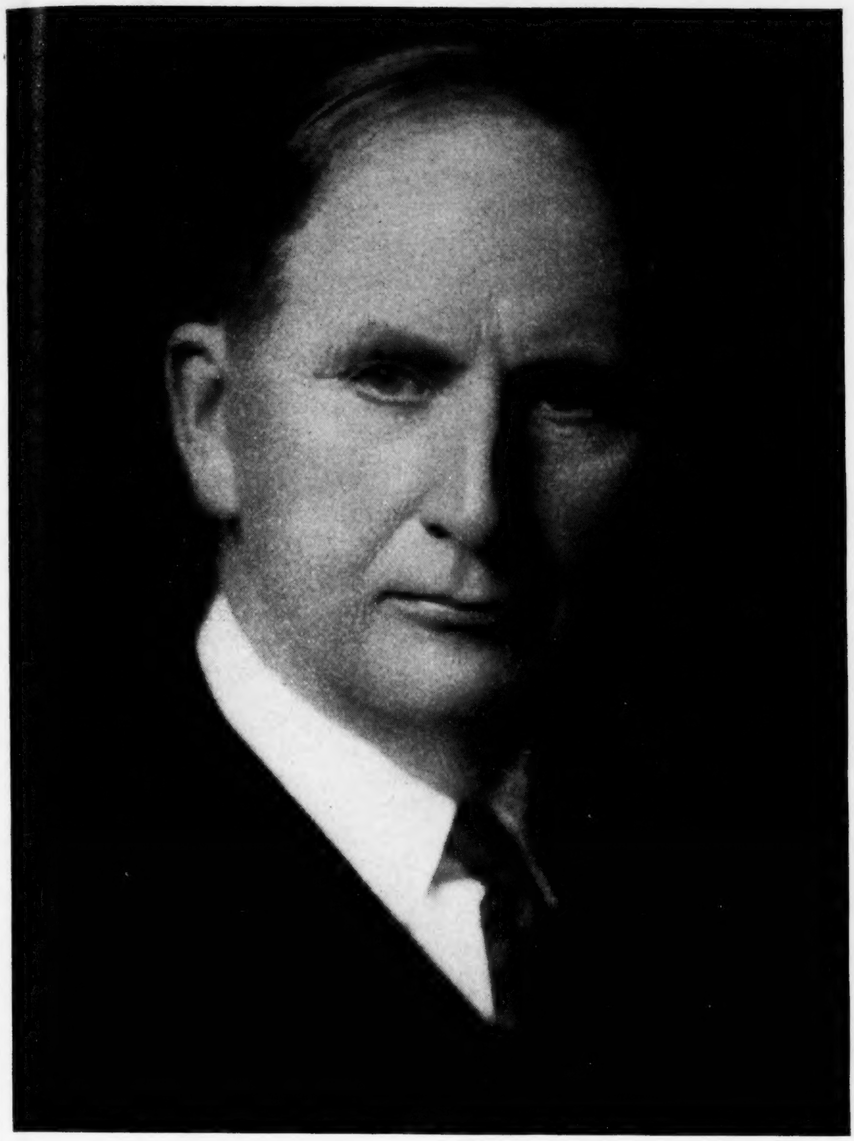
The value of production of the selected companies included in this table for the year 1943 was 3,177,576 thousand dollars. This represents approximately 42 per cent of the total estimated value of production of the chemicals and allied products industry for the year 1943.

The value of production of "chemicals" shown in this table is 1,341,682 thousand dollars. This represents approximately 61% of the estimated value of production of "chemicals" in 1943.

Table IV—Estimated Value of Output in 1943 for Certain Companies Manufacturing Chemical and Allied Products—By Product Group.

Product Group	Includes the following Number of: Companies	Plants	1943 1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Total
			Thousands of Dollars				
Chemicals:							
Inorganic	38	109	$127,889	$137,256	$139,115	$144,588	$549,048
Coal-Tar							
Crudes and Intermediates	8	18	37,400	41,100	44,200	43,700	166,400
Finished Prods. (a)	8	17	36,738	39,573	41,292	42,251	159,854
Non Coal-Tar							
Synthetics	21	41	100,411	104,973	125,857	135,139	466,380
Total Chemicals			$302,438	$322,902	$350,464	$365,678	$1,341,682
Allied Products:							
Chemical Cotton Pulp	3		12,782	12,290	12,700	12,700	50,472
Compressed and Liquefied Gases	3	240(c)	30,031	30,353	32,008	33,076	125,468
Drugs, pharmaceutical, medicinals	11	11	62,404	63,161	69,644	70,795	266,004
Explosives-industrial ..	4	42	34,047	33,514	34,379	33,728	135,668
Fertilizers	10	61	25,252	21,610	13,007	12,628	72,497
Plastic Materials	18	29	64,627	66,490	70,902	76,000	278,019
Rayon and Allied Products (b)	15	31	111,476	112,750	116,197	116,500	456,923
Soap	11	27	103,799	118,568	114,434	114,042	450,843
Total Allied Products..			$444,418	$458,736	$463,271	$469,469	$1,835,894
Total Chemicals and Allied Products ..			$746,856	$781,638	$813,735	$835,147	$3,177,576

(a) Does not include any medicinals, plastic materials, color lakes, and synthetic rubber.
(b) Includes substantially all plants manufacturing viscose, cupra, acetate rayon, cellophane, and nylon.
(c) Approximate.



Personalities in Chemistry

MARTIN HILL ITTNER

By A. D. McFadyen

THE FORTY-FIVE fruitful years spent by Martin Hill Ittner as research chemist and chemical engineer in the field of soaps was climaxed at The Chemists' Club in New York in January, 1942, when, in a meeting held jointly by the American Section of the Society of Chemical Industry, the American Chemical Society, the American Institute of Chemical Engineers, the Electrochemical Society, and the Société de Chemie Industrielle, Ittner was awarded the Perkin Medal for 1942. Practically his entire career has been spent with the Colgate-Palmolive-Peet Company and its predecessors. Ittner's many contributions to the soap industry include commercial processes for the hydrogenation of fatty oils used in soap manufacture, improvements in the fields of soap manufacture, glycerol production, fatty acid distillation, and countercurrent hydrolysis of fats with water to fatty acids and glycerol.

Ittner entered the soap industry when soap makers were also candle makers. For over seventy-five years the desideratum of the industry had been to make hard fats out of soft oils. During the first decade of the present century scientists became very active in research work, striving to accomplish this result through the catalytic addition of elemental hydrogen to soft oils. These researches finally resulted in several successful methods, so that by the second decade of the twentieth century hydrogenation of soft oils to hard fats became an established commercial success. Both in the research work on hydrogenation and in the development of successful commercial methods therefor, Ittner played an important part.

Another of his life-long activities had to do with the hydrolysis of fats. Working with representatives of Ernst Twitchell as far back as the turn of the century, Ittner set up a pilot plant at Jersey City capable of hydrolyzing 10,000 pounds of fat daily. After months of study and pilot plant operation, fatty acids could be produced in this way which were suitable for the production of soaps, and the practice of the process has since spread around the globe. Despite the strides that have been made by Ittner and his contemporaries in this and other fields relating to the soap industry, his search for improvements continues. "It would be rare, indeed," he says, "for a process to be invented that is so perfect that it cannot be improved upon." He has since developed a countercurrent process for the hydrolysis of fats with water alone, which is now being used on a very large scale for the production of fatty acids and glycerol.

Although soap makers are the largest producers of glycerol, the methods of recovering and refining glycerol long in vogue left much to be desired both in refining yields and in the quality of the product. It was common practice to resort to several successive distillations in an effort to get a pure product. The distillate obtained generally required additional concentration to remove excess water and bring it up to desired strength, and there always remained very appreciable proportions of glycerol from each distillation which were so dilute and so inferior in quality that they had to be worked over to make them salable. Ittner developed a distillation process and designed and built a still which gives a product almost free from impurities, even when operating on soap-lye crude glycerine, the entire distillate being salable with but a single distillation and of about 99.6% concentration without the necessity of resorting to a separate concentration step or redistillations. At the same time his process multiplied the capacity of the stills fourfold, while reducing steam consumption to a quarter.

The travail of the soap chemist extends to many details appealing to a fastidious public, such as color, perfume, freedom from rancidity, etc. Forty years ago Ittner whipped the problem of rancidity and color change once and for all. Formerly soaps made from the best materials, even from edible fats, commonly showed a tendency to become rancid, as well as an

(*Turn to page 683*)

Reaction towers at the vanillin plant of Howard Smith Chemicals, Ltd.

CANADA Reaches New Heights in Chemicals Production

by W. A. JORDAN, Chemical Industries' Canadian Correspondent

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RICH IN minerals, grain, timber and power, Canada is gradually coming into her own as an industrial nation. The value of her production of chemicals and allied products in 1942 amounted to nearly $500,000,000, representing a three-fold increase over 1939. Sulfuric acid output has more than doubled.

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DURING the past four years Canada has undergone an industrial transformation which under less urgent circumstances would have taken a quarter of a century, and no phase of this growth has been more important or spectacular than the expansion of the chemicals and explosives industry. Throughout the country, mammoth new plants have been erected to produce a host of chemicals never before manufactured in the Dominion, and on a scale far in excess of past Canadian operations.

Capital investment in the chemical and allied industries has soared from the $170 million of 1939 to an all time high of $410 million at the beginning of this year. Of this $240 million increase in capital investment, $100 million has been private capital, and $140 million has been made available by the Crown company, Allied War Supplies Corporation.

Although this public investment was supervised by the Crown company, actual creation and operation of the plant facilities was wisely entrusted to long-established chemical corporations. On the resources of private corporate bodies, of experience, of management, and technical skills, rested the attainment of production goals set by wartime necessities. Three and a half years ago the plans for these giants were not even on the drafting board; today, overall stockpiles of many chemicals have increased to the point where production is being gradually reduced to meet war wastage levels.

Canada's chemicals and explosives program embraces some 38 new projects, 34 of which have come into production. Of the 18 major projects on the list, 10 are chemical producers, and three turn out explosives. Ten of the 16 smaller establishments are chemical units. Employment in these war plants totals some 50,000 workers, of which a third are women, whereas total employment of the chemical and allied industries approximates 100,000 workers, or almost 10 per cent of Canada's entire industrial forces. The number of employees of the chemical industry, for the ten-year period, averaged 17,700.

At present, censorship beclouds a complete revelation of recent chemical developments in the Dominion, but it may be said that four new anhydrous ammonia plants have been placed in operation, two large sulfuric acid units, and other undertakings have been created to manufacture hexachlorethane, monoethyl aniline, aniline oil, carbamite, phthalic anhydride, dibutylphthalate, diphenylamine, acetic anhydride, synthetic butanol, alkylate, and activated charcoal.

Production of wartime chemicals and explosives now averages 10,000 tons weekly, and an examination of capital commitments would permit an approximate breakdown of this tonnage into one-quarter explosives, one-half ammonia and ammonium nitrate, and the remaining one-quarter as other chemicals.

However, wartime records often tend to obscure, or overshadow, the usually more permanently indicative developments of an industry, and it may be noted that the peacetime chemical industry of Canada was far from static, and war has served merely to intensify its dynamic characteristics. Emerging from infancy as a result of the stimulus of 1914-18, progress has been steady and substantial, and, particularly in the last decade, the chemical production curve has climbed upward without interruption. Even in 1937 the value of chemicals and allied products manufactured exceeded boomtime 1929 by 47 per cent, and in 1939, before war-engendered plants were conceived, production value was up 15.2 per cent over 1929. Furthermore, during the general business recessions of the early thirties chemical production did not dip as sharply as the general index and led the advance to higher levels.

Chemical Exports

Although pre-war Canada was the fifth trading nation of the world, chemical exports were insignificant, and did not exceed \$25 million annually. Primarily, chemical producers have been concerned with supplying domestic demands, and thus about 50 per cent of the Dominion's consuming needs have been met by Canadian industry. Exports have been confined to a very few items, such as calcium carbide, calcium cyanamide, ammonium sulfate, acetic acid, and fine chemicals such as salts of domestically produced nickel, cobalt, uranium and radium.

Largely as a result of its essentially domestic character, the chemical industry is concentrated in a relatively small area, which extends, roughly, only one-fifth of the distance across the Dominion, and is centered in Ontario and Quebec. More recently, some extension of the industry has been evident in the western provinces and to a lesser degree in the maritimes. Two significant western projects are the expansion of the Trail B. C., ammonia and ammonium nitrate units, involving an additional investment of \$8 million, and the creation of the \$10 million Alberta Nitrogen Co., with a rated 200 ton per day ammonium nitrate capacity, based on reclamation of nitrogen from Alberta gas. Nevertheless, Ontario and Quebec still account for 95% of chemical production.

This comparatively narrow belt in Ontario and Quebec constitutes the industrial heart of Canada, and therein reside 60% of the Dominion's population to form the greater market for manufactured goods. The concentration of the chemical industry in this area is a logical development in view of several considerations. A vast nation, with a population of a few scattered millions, is faced with major distribution problems and costs. It is essential, therefore, with freight rate classifications on raw materials lower than on finished chemicals, that producers be located as close as possible to the point of ultimate consumption. Furthermore, this section of Canada has abundant, large block supplies of low cost electricity, water borne freight for seven months of the year, vast salt beds, tremendous deposits of high grade, easily quarried limestone, and readily available coal, mineral, and forest resources.

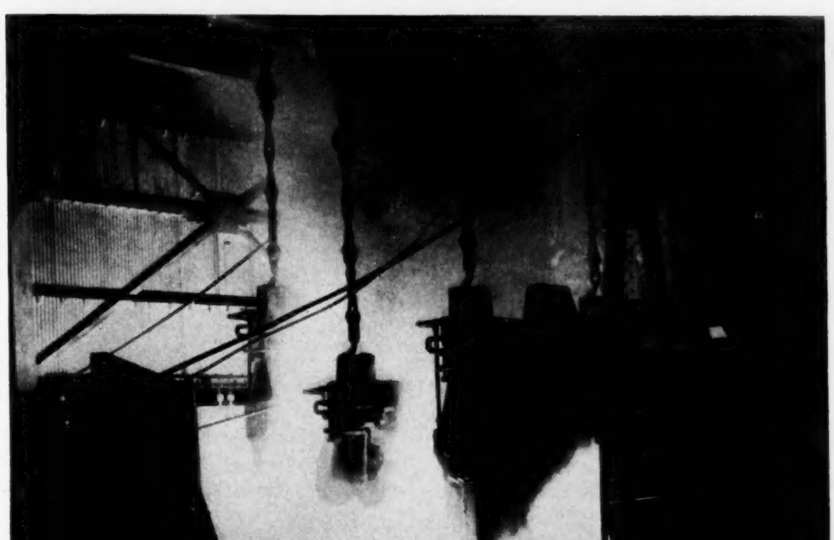
The growth and character of a chemical industry, functioning mainly in the interest of domestic needs, has naturally been dependent upon, and parallel to, the Dominion's progressive industrialization. Canada, prior to the past war, was essentially an agricultural nation, but in the ensuing 25 years much has been accomplished in an industrial sense. Waterfalls have been harnessed to produce electrical power; great, modern factories have been erected; and mining and pulpwood resources have been exploited in territories previously unmapped and unexplored.

Even though the chemical industry has kept pace with such developments, the policy followed relative to expansion had to be in essence relatively conservative. For, with a population only one-twelfth that of the U. S. A., tonnage demand for many special chemicals is often not immediately large enough to warrant the erection of new units, or the manufacture of new products, at as early a date, as for instance, in the U. S. A. Two other factors which have inhibited the growth of the Canadian industry are the ease with which chemicals could be shipped from Europe to inland Canadian ports, and the much larger scale, and usually lower unit cost, chemical producing operations carried on in the U. S. A.

However, as a criterion of the fundamentally progressive character of the industry it may be noted that in the decade preceding the present war a list of the main new chemicals added to the made-in-Canada roster includes: elemental sulfur from smelter flue gases, tri and perchlorethylene, acetic anhydride, alkali phosphates, vinyl acetate and vinyl chloride co-polymers, hydrogen peroxide, sodium chlorate, sodium silicate, sulfur mono and dichloride, liquid sulfur dioxide, pentasol acetate, carbon bisulfide, calcium chloride, metallic naphthenates, lactic acid, and a large number of fine chemicals.

The Chemical and Allied Industries classification, for statistical purposes, embraces 13 groups as follows: coal tar distillation, heavy chemicals, compressed gases, fertilizers, medicinals and pharmaceuticals, paints, pigments, and varnishes, soaps and washing compounds, toilet preparations, inks, hardwood distillation, adhesives, polishes and dressings, and miscellaneous chemical products. Therein are included 869 manufacturing establishments, capitalized at \$410 million, and with 1942 output of \$472 million. Of this total, \$204 million is assigned to the miscellaneous chemical group, which is largely the statistical "breadbasket" for wartime chemicals and explosives not reported individually.

The heavy chemicals category, as it is defined in the foregoing classification, includes only those plants devoted primarily to the manufacture of chemicals. Only 30 establishments are so categorized, with capital employed of \$65 million and 1942 output of \$62 million. There are, of course, numerous other concerns which manufacture chemicals as an incidental, but frequently important, part of their activities, such as liquor distilleries, coke



The world's largest electric furnace, where lime and coke are fused together to form calcium carbide. North American Cyanamid Co., Niagara Falls, Ontario.

plants, non-ferrous metal refineries, soap works, etc., but no record of their output is incorporated in the preceding total. Therefore, a special compilation has been made, which gives a reasonably accurate summary of the total output of chemicals, as gathered up from all industries, and is diagrammed in the "pie" chart. This summation includes only those chemicals made for sale, as no adequate record of intermediates made for the further use of producers is available.

Several limitations exist to modify the detail in which this information may be presented, the main one of which is the fact that many chemicals are made in Canada by less than three companies, and where such is the case, production figures may not be released by the Bureau of Statistics. Too, wartime regulations prohibit the publication of tonnage output of a number of important chemicals, individually. Hence, "group classifications" are employed, as follows: acids, calcium compounds; sodium compounds; organic chemicals; fine chemicals and precious salts; compressed and liquid gases; ammonium, sulfate, phosphate, and superphosphate; and other chemicals. A survey of these eight classifications will afford a rather intimate picture of the chemical producing industry and as comprehensive a one as can be prepared at present.

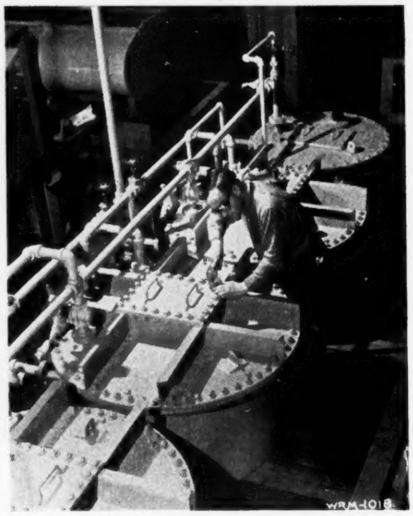
Production of acids, including acetic, muriatic, nitric, sulfuric, phosphoric, and stearic, was evaluated at $6.7 million in 1942, up a million dollars over the preceding year, and $4.3 million over 1939. The heavy production in this category is sulfuric, with ten units operating currently, and the bulk of the output being manufactured from domestic pyrites or by smelter flue gas reclamation. The latter has been one of the most noteworthy developments of the industry.

There are two sulfuric acid plants operating on a modified contact process, utilizing flue gases from International Nickel and Consolidated Smelters. Most of the output of the former is used by Canadian Industries, Ltd., to manufacture nitre cake, and the output of the latter is consumed by the producer in the manufacture of fertilizer.

Hydrochloric acid is made by the Dupont affiliate, Canadian Industries, Ltd., in four different works, and nitric is made by two companies, apart from government projects. Prior to the war there was only one unit for the production of synthetic nitric in Canada.

Phosphoric acid is made for sale by only one company, although Consolidated Smelters has a producing unit for fertilizer manufacture. Virtually all the phosphoric is made from Florida or Montana phosphate rock. Glacial acetic is made only by Shawinigan Chemicals; stearic, lactic, hydriodic, and hydrocyanic acids are each the products of single concerns.

The output value of calcium compounds totalled $16.9 million in 1942, up $7 million over 1939. Carbide, cyanamide, and cyanide are the major items of this group, these being manufactured in the vicinity of the electric generating centers of Niagara Falls and Shawinigan Falls. At the latter point, Shawinigan Chemicals, with an installed furnace capacity of 95,000 hp. and rated annual carbide output of 200,000 tons, produces the carbide for domestic and export sale as such, but mainly as the basis for the synthesis of acetates. An interesting development at this point is the installation of a completely enclosed, continuously operated,



Scene in plant of Defense Industries, Ltd., which makes chemicals for smoke screens.

furnace, with a tapping wheel employed so that carbide is cast into 200-pound, readily handled, cooled, and crushed, pigs.

The North American Cyanamid Co. operates a 240,000-ton annual production carbide plant at Niagara Falls, but uses its entire output for the preparation of cyanamide, and by further furnacing, cyanide. Normally, about two-thirds of the cyanamide is exported, and the cyanide is used in Canadian gold mining activities.

The value of sodium compounds produced last year amounted to $8.4 million, as compared with 1939's $4.5 million. The alkalies division of the industry is based chiefly on the vast salt beds of western Ontario, which underly some 3000 square miles. Therefrom in this area are manufactured caustic soda, soda ash, chlorine, and pertaining chemicals.

Canadian Industries, Ltd., is the sole caustic soda producer, and two new units have been erected in recent years in eastern Ontario and Quebec to serve the growing paper and viscose rayon industries. Salt for these operations is transported by boat from the western Ontario deposits. Salt cake is also manufactured by the same company in two other plants.

Nitre cake is prepared by two concerns, and its manufacture provides an interesting example of the vagaries of chemical industry. In smelting the copper-nickel ores of the Sudbury district, nitre cake is required at one stage of the operation. The development of the synthetic ammonia process, and the ammonia oxidation method of producing nitric acid, eliminated the output of byproduct nitre cake, but had no effect whatsoever on the existing demand. Now, sodium sulfate (decahydrate) is shipped in from the 115 million ton natural deposits of western Canada and fused with flue gas sulfuric acid to yield the required nitre cake. Hence this chemical has graduated from a byproduct to one of primary importance.

Sodium silicate is manufactured by the Philadelphia Quartz affiliate, National Silicates, and by Cyanamid. Sodium phosphates and chlorate are made only by Electro Reduction Co.

Organic chemicals, excluding acid, were valued at $27.3 million last year, compared with $6.8 million in 1939. The chief producer in this field is Shawinigan Chemicals, with activities based on low cost electricity for the manufacture of carbide, and thereby the synthesis of a long list of acetates. Primary processes entail production of acetic anhydride by direct oxidation of acetaldehyde, direct synthesis of acetone catalytically from acetylene and steam, ethyl acetate by catalytic condensation of acetaldehyde, and vinyl resins by combination of acetylene and acetic acid.

Other organics produced in Canada include, tri and perchlorethylene, trichlorethane, ethyl alcohol, glycerine, byproduct benzol, and a few chemicals such as cresol and phenol. Canada's progress in the coal tar field has been minor.

In the fine chemical division, with output at $3.9 million relative to the $1.7 million of 1939, the main producers are Merck and Mallinckrodt. Radium and uranium salts are recovered in the refinery of Eldorado Mines. One comparatively recent development of significance has been the manufacture of vanillin from waste sulfite liquor by Howard Smith Chemicals. By this process, unique to Canada, vanillin is manufactured from the lignin of the sulfite liquor, with a yield of 2.5% calculated on a wood basis.

Compressed and liquid gases are the major products of 33 companies, capitalized at $7 million, and output valued at $13.6 million. Acetylene and oxygen comprise the heavy volume at 105 and 522 million cubic feet respectively. Compressed and solid carbon dioxide, nitrous oxide, liquid chlorine, liquid sulfur dioxide, and hydrogen peroxide are each the product of single companies.

Output of ammonium sulfate, ammonium phosphate, and superphosphate amounted to $7.8 million for the year, up $2.6 million over 1939. There are only four units for the production of these basic materials, although fertilizer mixing plants are located throughout the country.

The "other chemicals" evaluated at $15.6 million, include such items as white lead, zinc oxide, cobalt and nickel salts, ferric chloride, lead arsenate, phosphorous, white arsenic, and ammonium nitrate. With the exception of the last named there is only a single producer of each of these items.

Another important phase of the chemical industry is the dynamically expanding synthetic resins divisions. There are but two producers in the Dominion at present, and although 1939 output was only a million dollars, reliable estimates place current production at about five times this.

Three basic resins are manufactured, the vinyl acetate and vinyl chloride copolymers, produced in the Empire's largest units by Canadian Resins and Chemicals, owned jointly by Shawinigan Chemicals and Carbide and Carbon Chemicals Corp., and the phenolics of Bakelite Co. Canadian Celanese is at present erecting a $5 million plant, which may have some interest in cellulose acetate.

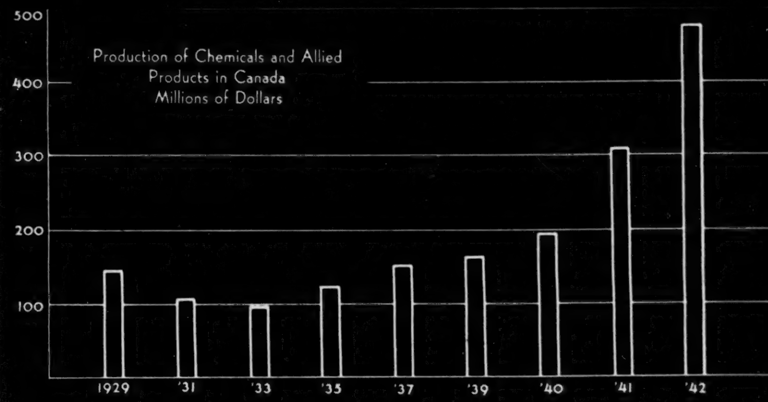
The future of Canada as a chemical producer is naturally conjectural, for so much will depend on the character of the post war economy, on population trends, treaties, tariffs, and trade agreements. But a few observations can be made to cast some light on the probable shape of things to come.

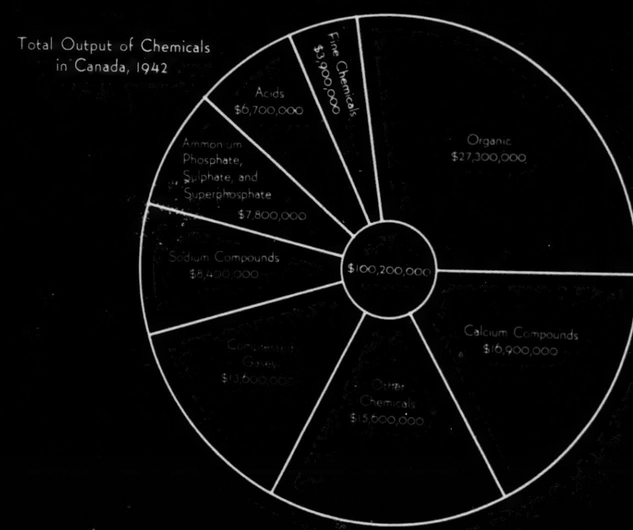
It may be assumed that a number of Government financed wartime chemical plants are too highly specialized to be of great post war value, but officials maintain that the expanded ammonia and ammonium nitrate capacity and the low cost process developed in this connection will be of substantial import to the nation's number one enterprise, the agricultural industry. Other plants are cited as being fairly readily convertible to cellulose plastic production.

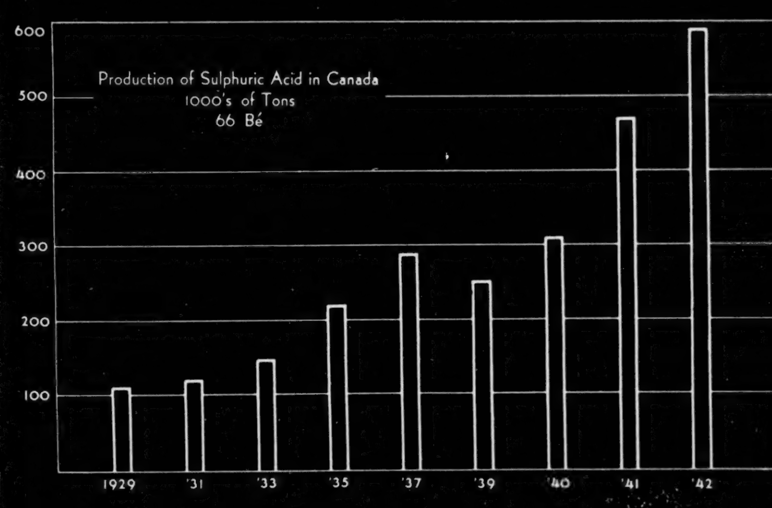
Throughout Canada today, in the midst of hectic war production, pre-postwar committees are convening regularly, studying new products and new processes, formulating marketing plans, and without a doubt, considering export possibilities, on which any major growth must be predicated. Chemical plans are being laid by industries normally not regarded as chemical producers, pulp and paper concerns, rubber processors, petroleum refiners, and textile companies. Agricultural committees are appraising the chemurgic potentialities of western Canada.

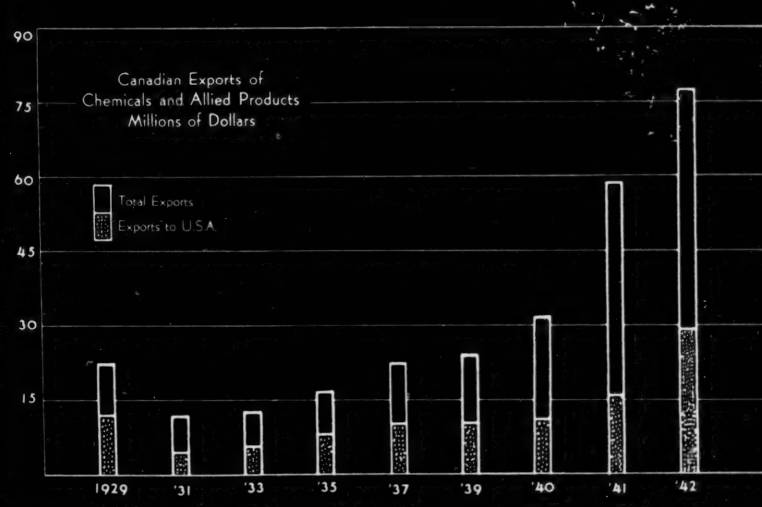
Suffice it to say that Canada will emerge from this war with vastly expanded manufacturing facilities, with experience in large scale manufacturing operations, a consciousness of her chemical resources, and trained personnel numbered in thousands.

Next month a second article by Mr. Jordan will appear on "Canada as a Consumer of Chemicals."









These steel drums have gone to war and have been replaced by fiber containers and multiwall paper bags.

To conserve steel, returnable carboys are being used in many cases in place of steel drums.

What the War Has Taught Us About Containers

by T. PAT CALLAHAN, Supervisor of Containers, Monsanto Chemical Company

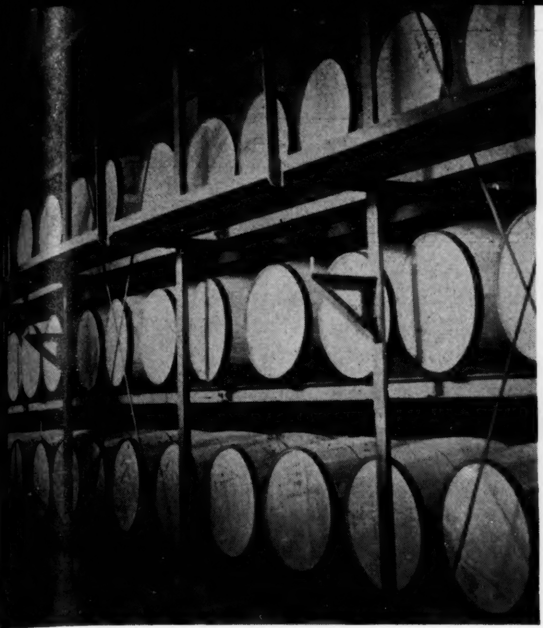
FEW ASPECTS OF WARTIME chemical production have been the subject of more or bigger headaches than containers and packaging. But there is evidence that these headaches have not been in vain. Out of wartime experience promises to come better and cheaper packaging for many bulk chemicals, as well as economies through standardization of containers.

PACKAGING in the chemical industry entails the use of a variety of containers ranging from half-ounce sample bottles to 10,000-gallon tank cars. Altogether there are probably several hundred distinct types and variations of containers used in the shipping of chemicals. For this reason the problem which faced the chemical industry as a result of wartime curtailment of certain container and packaging materials was a tremendous one, and it is only by substitution of less critical materials, by redesigning some of its containers, and by eliminating or consolidating others, that the industry has been able to continue to ship its products without any serious upset. At the same time it has learned some things about containers that will serve it in good stead after as well as during the war.

One of the most serious shortages which appeared on the horizon even before our entrance into the war, was steel. Steel containers of all sizes and gauges are used extensively in the chemical industry and a curtailment of steel packages could have caused a very difficult situation in chemical packaging. The most commonly used steel container in the chemical industry is the 18-gauge single trip, 55-gallon drum. Under Interstate Commerce Commission Regulations for many products, this drum could be used for one trip only and was commonly referred to as a single trip drum. The Interstate Commerce Commission at the request of the Bureau of Explosives and the Manufacturing Chemists' Association amended the Interstate Commerce Commission Regulations for the Transportation of Explosives and Dangerous Articles to permit the reuse of these so-called singles trip drums, so that they are now being returned by customers for refilling. In many cases as many as four to six trips have been obtained from these drums and the amount of steel saved runs into the thousands of tons.

The Container Section of the War Production Board has been most cooperative with the chemical industry, and although it has been necessary for the War Production Board to issue several restrictive orders on the use of steel for containers, there have not been any serious cases where steel has been denied for essential packaging if the material could not be packed satisfactorily in a substitute container. Tight wooden barrels have been substituted for steel in a great many cases and are proving very satisfactory. Many powdered materials which were formerly packaged in steel have been taken out of steel and are now packaged in fiber drums, wooden barrels, corrugated and solid fiber boxes, and multiwall paper bags. All along the line of chemical packaging, from small units to large, containers using tin, zinc, aluminum, iron and other critical materials have been replaced wherever possible by paper cartons and fiber and wooden containers.

When Order M-81 of the War Production Board was issued which restricted the use of tin in packaging many chemi-



Slack wooden barrels, which require a minimum of steel, are proving invaluable in the packaging of chemicals.

Multiwall paper bags using a minimum of critical materials are being substituted for rigid containers for many products.

cals, the chemical industry attempted to procure black plate coated with synthetic lacquers. This, however, did not save any of the base metal, so that finally it was necessary to turn to specially lined and treated fiber and paper cartons. These are proving satisfactory in most cases. When the war is over and metals are again obtainable, however, there is no doubt but what some of the products so packaged at present will return to metal containers.

When zinc for galvanizing became very critical, research on resin and lacquer coatings proved that for most chemicals these provide a substitute drum lining which is just as satisfactory as tin or zinc and which will continue to be used after the war. The performance of lacquer and other coated drums in actual shipping service has been most gratifying, and such containers will definitely have a place in post war packaging of many chemicals. Resin and lacquer coatings for containers afford the necessary protection, and they are materials which can be quite easily applied by the fabricators of containers.

Certain chemical developments in the construction and protection of fiber and paper brought about by the demands of the Armed Forces for the protection of vital war materials have definitely improved packages constructed of these materials, and a great many such substitutes for heavier and more expensive packages are here to stay. Here again, new lacquer and resin coatings and impregnating materials have played a major part in the development. The chemical industry will find many uses for such packages.

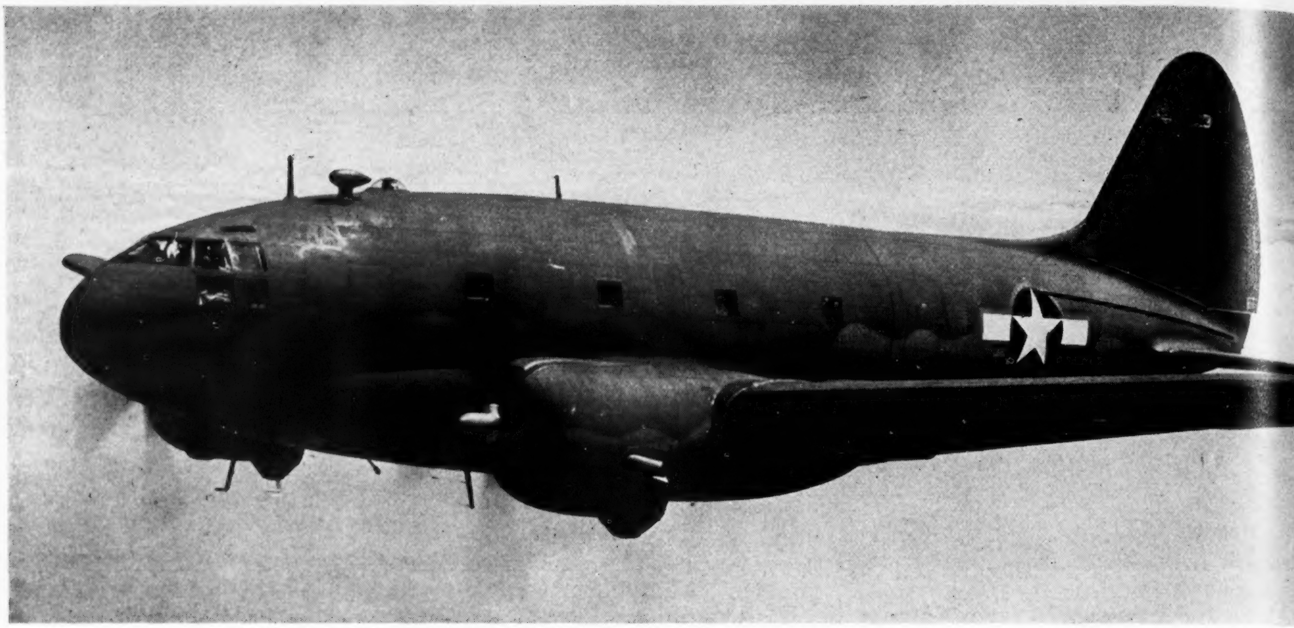
Prior to the war, the chemical industry like a great many other industries supplied its products to the trade in various sizes of containers depending upon the wishes of the consumer. This practice worked an undue hardship on the manufacturer in that at all times he was forced to carry a supply of various sizes of packages. The wartime shortage of containers has taught us that standardization of packages and sizes can be accomplished, and in fact present experience will help immeasurably in the formulation of a postwar program of standardization which should eliminate a great many off-size packages formerly used.

As a matter of record, the Container Committee of the Manufacturing Chemists' Association had been working before the war toward standardization of packages for chemicals, and it is probable that this worth-while program will continue when the war is over. One recommendation made by the Committee was that the industry standardize on two sizes of steel drums for liquids, namely, 5 and 55 gallons. It can readily be seen that if this suggestion is adopted after the war, a lot of mongrel packages will have been eliminated and stocks of material will become more flexible. These two sizes of containers will serve adequately for most liquid chemicals.

In the chemical industry as well as many other industries there has always been a tendency on the part of some to over-package their products and some to under-package. A great amount of chemical packaging is now being done under the direction of some government agency. Agencies such as the Ordnance Department, Chemical Warfare Service, Medical Corp and Lend Lease, have made a study of the conditions surrounding the transportation and delivery of chemicals to points all over the world. These surveys and the resulting recommendations given to the industry have been most helpful in safely packing chemicals. Chemicals which are to be transported to the far corners of the world under war conditions require packaging considerably different than anything used before the war. When a shipment of vital chemicals is ordered, for instance by the Ordnance Department, it must be packaged to withstand almost unbelievable hazards of handling and weather. The government services have much photographic evidence of the rigorous conditions that packaged materials going into combat areas must withstand. Chemical companies will do well to study the requirements for packaging as laid down by these various agencies. From them can come a great many improvements in chemical packaging that will be most beneficial and helpful when things return to normal.

There is no doubt that many of the things that have been learned in the wartime packaging of chemicals will carry over and pay dividends in the postwar period. For example, in the packaging of plastic molding powder, steel drums were formerly used in order to obtain the necessary protection from moisture. Now, six-ply multiwall paper bags have been substituted. These bags have two sheets of kraft paper, laminated with asphalt for moisture protection and are doing a very satisfactory job in the movement of millions of pounds of molding powders. Were it not for the shortage of steel occasioned by the war, the development of this multiwall paper bag might have been delayed for a long time and the economy effected would not have been realized.

From these difficult wartime shortages will come a great many developments in chemical packaging which will prove beneficial to the industry and consumers alike. The extent to which substitute packages are being used with no appreciable complaints is ample proof that a great many are here to stay.



Curtiss Commando cargo plane (C-46)—where pounds count!

Some Chemical Problems In Aircraft Manufacture

by C. C. FURNAS

Director of Research, Curtiss-Wright Airplane Division

IN ITS ROLE of accelerator of technological trends, war has clearly established the essentiality of chemists, chemistry and chemicals in making possible the great present and future strides of the air transportation industry. Materials of construction, adhesives, coolants, protective coatings, hydraulic fluids, fuels, are only some of the chemical problems of aircraft manufacture for which completely satisfactory solutions are yet to be found.

THE MODERN airplane is a flying monument to applied physics. The substance of the structure is beginning to come under the close scrutiny of the chemist, who is intent on helping to improve a device which, though strikingly successful, is susceptible to definite improvements.

Pounds vs. Payload

In both the military and commercial operations the function of the airplane is to carry a useful load from here to there. For a plane of given size, aerodynamic characteristics and available power, taking off from a given airport, there is a given gross weight which can be lifted into the air. This gross weight is made up of the fixed weight of the airplane structure with its auxiliary equipment, the fuel and the "payload." The quantity of fuel depends upon the length of the anticipated flight. Hence the payload becomes the difference between large quantities, and if the flight is a long one it rapidly approaches a vanishingly small quantity. Every pound which can be taken from the weight of the airplane structure is a pound gained in payload. The penalty of the pound was almost inconceivable to the writer when he first grasped its significance. The experience of the commercial airlines in continental United States has been that every pound of weight added to the structure costs $100 in terms of lost revenue during the average five-year useful life of the plane. In the case of longer runs, such as the transoceanic services, this weight penalty amounts to as much as $100 per year per pound—and these are conservative figures. Hence, in trying to cut down on the weight of an airplane structure, we are playing for very high stakes and the chemistry and physics of the utilization of materials takes on extreme significance.

Up to now, the aircraft manufacturing industry has been largely at the mercy of the vendor in the matter of selection and use of materials. This is rapidly changing and the manufacturer is becoming more and more interested in going back to the source of materials and seeing what can be done to improve quality and efficiency of utilization, with an eye to the ultimate saving of weight.

At present, the industry is almost completely metal-minded, because the introduction of light alloys in the early twenties resulted in the building of substantially better planes than those which had been made of other materials. However, the dramatic rise of plastics has been changing attitudes to a considerable extent and there is a steady stream of publicity to the effect that the airplane, as well as the automobile, of tomorrow may be largely of plastic construction. The proponents of wood also insist on keeping in the picture. Thus there is the technical battle going on which may result in the utilization of new materials or the re-use of old ones or, more logically, in a combination of various materials which will eventually produce the optimum airplane.

The situation is really quite analogous to that of building a house; that is, there is probably no one material which is ideal for all functions. As of now, the aluminum alloys dominate the field because they have a strength-weight ratio which exceeds that of most other available materials. In addition, their density is sufficiently low so that a rigid, as well as a strong, structure can be made without too many design difficulties. But the

very presence of this rigidity requirement in airplane structures opens up the possibility of the use of other materials. In other words, the material which shows the highest tensile strength in terms of weight is not necessarily the best material for airplane structures. Some of the more recent developments in plastics, particularly in combination with glass fibers, offer materials that have very attractive possibilities even though the so-called strength-weight ratio has not yet risen to that of the aluminum alloys.

But, important as it is, weight saving is not everything. The use of plastics and wood, either alone or in combinations, offers many possibilities in cutting down the man-hours and cost of airplane fabrication. In post-war competition these possibilities of savings will be the subject of a great deal of research and engineering work.

If one stands back and takes a broad view of the materials picture he can see an almost infinite number of combinations of wood, metal and plastics, some of which must have some real possibilities in improving or lightening the airplane structure and reducing its cost of manufacture. As soon as one follows this line of thinking he immediately jumps into an experimental program in which the chemist must play an important part. For combination of materials, the line of thought immediately goes to laminations, not only of woods, but wood, plastics and metals. This brings up the problem of adhesives which have been vastly improved in the last few years but are still a long way from perfection. Actually no one has yet discovered a completely satisfactory method of bonding two different kinds of material together with assurance that the marriage will be permanently satisfactory.

The Structural Problems

One of the goals of the structural engineer is to find some sort of a sandwich combination of materials which will be sufficiently light, but strong and rigid enough so that he can go into extensive true monocoque construction, wherein the wings and the fuselage can be fabricated on the eggshell principle rather than having to utilize a great number of spars and stringers to stiffen the structure. Such a sandwich material would consist of an inside and an outside layer which might be metal, or wood or plastic, spaced with a spongy filler that would weigh practically nothing and yet be rigid enough to give a composite with a high degree of stiffness. The light-weight spongy filler between the laminates is all-important. Very light wood, such as balsa or cork, are possibilities. Others are glass fibers or various kinds of foam materials, such as sponge rubber. None has yet been discovered which gives the desired properties of sufficient rigidity with vanishingly small weight. Here is a problem of combining fundamental and applied chemistry and physics that should challenge a great many people because of its paramount importance in the aircraft industry.

The possible introduction of laminations of combined materials may have revolutionary effects upon the structural engineer's activities. Inherently, when materials are put together by adhesives, the bond is such that it will not be able to withstand high concentrations of stress. However, if all of the material surface is bonded, the composite is one with more than adequate strength, provided there are no points of concentrated stress. At the present time, the structural engineer in the aircraft industry is schooled in designing materials which are tied together with rivets or spotwelds and which can withstand high concentrations of load at edges or corners, but if we are to use adhesively bonded laminates we must avoid those edges and corners which may result in high stresses. This indicates that the designer who wishes to utilize the newer materials which may materialize must throw away the old books and start over with an entirely new brand of thinking. Many advances have been made in the design of elemental structures such as tubes and elliptical shapes wherein laminates are put together by such adhesive operations as "Cycleweld" or the more conventional gluing.

Fuels

The aviation industry has thus far been, for the most part, a grandstand spectator in the game of fuel improvement. This is really a rather strange situation because there is no one who has as large an interest in fuel efficiency as the airlines. It comes back again to the penalty of carrying unnecessary pounds. Every pound of fuel which must be carried on the average flight means one less pound of payload. The recently much-publicized triptane as a super-fuel has caught the eye of the aviation industry in a most unusual fashion because it promises to reduce the weight which must be carried for given flights. When this fuel becomes available in pilot plant quantities there will undoubtedly be a comprehensive test program by the aviation engine manufacturers which may result in considerable engine redesign. It may also mean the opening of the door to a broader interest of the engine manufacturers in true fuel research, clear back to the processing. It may be hard to justify such an expansion of aviation research at the present time, but the vital interest of the consumer in this case indicates that it would certainly be worthwhile for him to have his hand in on the background activities.

If we lapse into the fantastic for a moment, we may bring up the ultimate possibility of the utilization of atomic disin-

THE AUTHOR

C. C. Furnas, strange as it may seem to those who don't know him, is a chemical engineer and former Olympic track star (5,000 meter event, 1920). He was never in an airplane factory in his life before 1942, when he joined Curtiss-Wright as director of research. He has a Ph.D. from Michigan, and during his professional career he has held positions with the U. S. Steel Corp., U. S. Bureau of Mines, and Yale University, the last as associate professor of chemical engineering. In addition, he has made a name for himself as a writer, having authored four books on popular science and edited "Rogers' Manual."

tegration as a source of energy for the airplane, where the weight penalty is so enormous. Before the shroud of secrecy closed down on experimental work, the possible utilization of the chain disintegration of the uranium isotope U-235, fired the fancy of the Buck Rogers' school of transportation. Whatever development work has been done on this during the past two years has rightfully been kept so extremely secret that there is no exact public knowledge on the prospects of the possible utilization of this new source of energy, but the aviation industry does have the information which has been made available to the public, in a very convenient pigeonhole. If its utilization slips into the realm of possibility it is a certainty that there will be a great deal of activity in pure and applied chemistry and physics as soon as the picture is formulated.

Lubricants and Hydraulic Fluids

The service demands on the lubricants of an aviation engine are much more severe than those found in the usual land or water transportation. Hence the quest for better and better lubricants is always with the engine manufacturer and user. The petroleum companies have been very active in this field for a great many years but here again the aviation industry logically has a direct interest which should materialize in more research and experimental work.

A great many of the actuating mechanisms of the plane are handled by hydraulic systems which are convenient means for transferring energy to flaps, landing gear, ailerons, rudder, etc., and keeping them under careful control. The hydraulic systems are being given a run for their money by the electrical systems, but it is quite probable that hydraulic equipment will have a permanent place in the picture. The devices must be completely reliable under extreme conditions of temperature, as an airplane may go from a tropical desert where the temperature is well over a hundred degrees to stratospheric temperatures of minus sixty-five, all within the space of a few minutes. This calls for fluids which have a very low rate of change of viscosity with temperature. Recent research work has resulted in the development of some fluids which are a definite improvement over the straight petroleum oils which have previously been used, but the ideal has by no means been reached. Not only must the viscosity characteristics be right, but the fluid itself must be permanent in terms of physical properties; it must be completely non-corrosive and have no tendency to gum or polymerize in any way.

In the same category are the coolants for the liquid-cooled motors. Prestone is now very largely used, but it cannot be said to be ideal in physical and chemical properties, particularly in the matter of permanence. Here again the search goes forward, with the aviation industry, unfortunately, largely as an interested bystander. It is to be expected that a more active participation will be forthcoming in the near future.

Ice Formation

One of the principal items in the safe maintenance of transport schedules in tough weather revolves around the prevention of ice formation on the wings. A halfway satisfactory solution is available in the form of the mechanical de-icing boots which are almost universally used in the winter months by the airlines. A definite step forward in ice prevention is now coming to the front in the utilization of the exhaust heat to keep the wings free of ice. There is every indication that this system will function very satisfactorily indeed, but here again we have the spectre of a weight penalty, because you can never get apparatus that doesn't weight something. The ideal solution to this problem would be one in which the surface of the wings and fuselage were of such a character that they would not be wetted by water, and ice would never have the opportunity of forming. A great deal of work has been carried on in this field for a number of years, but most of the results have been hopelessly negative. But the problem is still with us and the aviation industry is not yet willing to admit defeat. Undoubtedly, if a solution is possible, it will be found in an extensive study of chemistry and physics which will involve the investigation of surface forces which might lead to a surface coating or preparation which would give the truly satisfactory non-wetting surface.

Bomber nose of transparent, shock-resistant acrylic resin

Official photo, U. S. Army Air Corps.

Corrosion

As in all equipment where metal is used, corrosion is the ever-present beggar that we wish we did not have, but cannot avoid. In the case of the aluminum alloys in use at present the corrosion problems have been combatted with a fair degree of success. However, magnesium is a very interesting material of construction which is thus far largely relegated to a back seat, principally because of its corrosion characteristics. Particularly troublesome is the phenomenon known as "stress corrosion," which is probably given that name because no one knows exactly what it is or how it acts. A great many man-hours in various laboratories are being expended on the problems connected with the corrosion of magnesium and as of this date the solution is not yet in sight. One would be an extreme pessimist, however, if he contended that no solution could be found. The aircraft companies are becoming more and more interested in corrosion studies and will probably play a prominent part in building up the knowledge which will lead to the eventual use of magnesium as an aircraft construction material.

Miscellaneous

The insulation of the fuselage against transfer of heat and sound is of extreme importance, particularly in passenger transportation. Here again the weight penalty is ever-present and this must be balanced against the commercial necessity of keeping the passengers at least reasonably comfortable. The traditional sound and heat insulating material is kapok which is fairly heavy and also is hygroscopic. Glass fibers apparently offer an improvement over kapok, but the field is still wide open for other materials.

In any complex manufacturing operation there are many factory problems which are ever-present which call upon the services of the chemist and the metallurgist. The aircraft industry is just like the rest in this respect, and there are many trouble-shooting problems involving corrosion, heat-treating, checking of quality of materials, that are always with us.

There are a number of specialized items such as the ideal camouflage paint for military planes, which we do not yet have. It must be one which has the proper adhesiveness, color characteristics and aerodynamie smoothness.

The aviation industry is a great potential market for almost all the items that enter into any transportation field: surface finishes, textiles, improved glass, seat cushions, instrument panels, dishes, rubber tires. We need the best but we don't want it to weigh anything. The problem of the extreme penalty of a pound will always worry the aviation industry even more than it does the debutante.

Electrochems Discuss Reactions In the Electric Discharge

CHEMICAL REACTIONS produced in an electric discharge and the new electro-tinplating which saves half to three-quarters of the tin consumed by the old hot-dip method, shared the spotlight at the eighty-fourth meeting of The Electrochemical Society in New York last month.

ELECTROCHEMISTS, electroplaters and metallurgists were attracted by the special technical sessions on electrolytic cells, corrosion, electro-organic chemistry, strip steel plating and electroplating iron, that featured the 84th meeting of The Electrochemical Society held in New York City, October 13-16. Highlighted by the Joseph W. Richards Memorial Lecture, delivered this year by Dr. Beram D. Saklatwalla, eminent consulting metallurgist, the four-day program was concerned primarily with electrochemical developments pertaining to the war effort.

Of special interest was the session on chemical reactions produced in the electric discharge. The effect of an electric discharge on mixtures of gases and liquids has been known for some time, but only recently has the field been explored intensively. Some startling discoveries along this line are said to have been made during the war, but details are being withheld for the present.

It was stated that reactions in the electric discharge can be carried out with comparative ease. Starting with the same reactants but varying the proportions and the current, it is possible to control the relative yields of products obtained, particularly in the case of organic chemicals. Relatively low cost organic gases and liquids can readily be converted into products of high commercial value, it was reported. The reaction chambers in use for this type of work today vary in size from less than a cubic foot capacity to more than 100 cubic feet.

A paper by Dr. George Glockler and C. Alvin Hollingsworth of the State University of Iowa, described a polymerization product of acetylene and ethylene that was produced from various mixtures of these two gases in silent and semi-corona discharges. Properties of the polymer were as follows: Light transmission of thin films was observed in the visible region (4,000 to 7,000 Angstroms), with a maximum of about 6,000 Angstroms. Oxygen absorption followed an exponential law in the beginning stages of the reaction, and after about thirty hours a more complex relation was observed, since diffusion through the already oxidized portion of the solid particles of the polymer became an important factor. No solvent was found for the material but it was brought into colloidal solution in methyl alcohol. Its behavior under pressure and temperature showed that it was not thermoplastic.

The electrical characteristics of the ozonator discharge were described in a paper by Dr. T. C. Manley of Ozone Processes, Inc. It was stated that the ozonator discharge is intermittent; during each cycle of the alternating voltage there are two discharge periods alternating with two dark periods. An equation was given for determining the power consumption of an ozonator in terms of peak voltage, capacity of dielectrics, frequency, and discharge potential.

A third paper in this group, "The Molecular Complexity of Some Gases in the High Frequency Discharge," was read by a proxy for the authors, Drs. Melville J. Marshall and H. O. McMahon of the University of British Columbia. In the discussion from the floor it was stated that the crystal size of the cathode material has some effect on the results of electric discharge reactions. Dr. Sherlock Swann, Jr., of the University of Illinois, reported that he has started work on cadmium and zinc single crystal electrodes.

Other papers presented before the Electro-Organic Division, of which H. Jermain Creighton, Swarthmore College, is chairman, were: "Electro-Organic Chemistry in the Patent Office" by Joseph Rossman; "Electrolytic Reduction of Trinitro Aromatic Compounds to Triamines by Use of a Carrier Catalyst" by R. W. Lewis and O. W. Brown, Indiana University; "The Electrolytic Reduction of p-Nitrobenzoic Acid to p-Aminobenzoic Acid" by O. W. Brown, R. W. Lewis and P. H. Ravenscroft, Indiana University; "Electrolytic Reduction of Cinnamic Acid—A New Method of Preparation for *beta, gamma*-Diphenyladipic Acid" by C. L. Wilson and K. B. Wilson, Imperial Chemical Industries, Ltd.; "The Electrolytic Reduction of Amides" by Sherlock Swann, University of Illinois; "Electrolysis of the Nitroparaffins" by Ralph Pearson and W. V. Evans, Northwestern University; and "Electrolytic Oxidation of Thiosulfate in Ethylene Glycol Solution" by S. Glasstone, V. V. Barr and B. O. Heston, University of Oklahoma.

The wartime displacement of hot-dip tinplating by electro-tinplating was a subject of much interest in the technical session on strip steel plating. War-induced advances in the use of electrolytic tin plate indicate that the so-called "conservation plates" will find considerable postwar application in containers for non-processed foods, according to K. W. Brighton, American Can Co. Electro-tinplate is said to be superior to hot-dip plate in quality as well as requiring less tin. It also permits better control over the thickness of the coating. The opinion was advanced that as a result of the electro process, all tinplating will henceforth be done before fabricating as against first fabricating and then plating as has been the custom for many generations. Furthermore, it was stated the control of the plating industry is passing out of the hands of the automotive industry and into the hands of the steel producers.

Other papers on electro-tinplating were presented by E. W. Hopper, Crucible Steel Co.; F. A. Lowenheim, Metal and Thermit Corp.; and H. R. Copson and W. A. Wesley, International Nickel Co.

The Chemical Resources of FORTRESS EUROPE

by ERNST BERL
Research Professor, Carnegie Institute of Technology

IN THIS WAR OF MATERIALS, the defeat of Germany and her satellites is being hastened by critical shortages of natural resources. Dr. Berl, who was chief chemist of the Austro-Hungarian War Ministry from 1914 to 1919, gives his appraisal of the current chemical and other raw material supplies of the Axis.

THE NEED for convenient terms with which to refer to Axis held areas in Europe has given rise to such coined phrases as "Fortress Europe," "Inner or Central Fortress Europe," and "Fortress Germania," "Germany proper," or "The Reich." These phrases may attract the public fancy, but they are hardly suitable for scientific discussions unless properly defined.

For purposes of this article, then, let us consider Fortress Europe as Europe without Great Britain, Ireland, Iceland, Sweden, Spain, Portugal, Switzerland, European Turkey and southern Italy, plus that part of Russia which is occupied by the Axis troops. In 1938 this area comprised 300,000,000 people and 1,800,000 sq. mi. The Inner or Central Fortress Europe, on the other hand, would not include France, the northwestern part of Belgium, The Netherlands, Denmark, Jugoslavia nor Italy south of the River Po. Fortress Germania would be composed of Germany, Austria, Czechoslovakia and Hungary (96,200,000 population, 298,000 sq. mi. in 1938), or may even shrink to Germany prcper (67,000,000 population, 180,000 sq. mi. in 1938[1]).

In peacetime, Europe (500,000,000 population, 3,840,000 sq. mi. in 1938) took care of 90% of its needs. The remaining 10%, about 140,000,000–180,000,000 tons, were passed through the European ports. For the old Reich, 83% of the peace time needs were produced within her borders. The remaining 17% were acquired by export of her highly developed chemical, mechanical, electrical, textile, paper, leather, glass, toy and other industries.[2]

About 25% of the goods transported in the Reich were moved on her canals and rivers, the bulk of the remaining 75% by railroads. Therefore the destruction of railroad centers and of the Moehne and Eder dams, followed by the drainage of part of the Ruhr canals, have important consequences.

Fortress Europe is now completely blockaded. It is forced to exist without outside resources of any kind. Germany is getting along only by plundering her own natural resources and those of the occupied countries at an exhaustive rate and by practicing extreme thrift, especially in the distribution of foodstuffs, clothing and fuel in conquered countries.

War needs are different from those of peace. About 70% of all goods produced now in Fortress Europe are used for war purposes. Civilians get the 30% remaining. This has caused a marked reduction in the standard of living, especially in the occupied countries which have to send most of their raw materials to the Reich. The standard of living in Germany is higher than in the occupied countries.

Only a strict organization and the avoidance of waste enables Germany with her dwindling resources to maintain the present war operations. During 1939-40 the Reich gained much more by looting the occupied countries than was spent for their conquest. During 1941, she was able to maintain an approximate equilibrium, but since 1942 (Stalingrad) a continuously increasing deterioration of the raw material situation and of production capacity has created a noticeable drain which promises to become worse and worse with the lengthening of the conflict. By forcing "organized hunger" upon the occupied countries, Germany up to now has been the best fed country in Europe, but this situation, too, will deteriorate in the near future. Germany already consumes 50% less foodstuffs than before the war, while working hours have been increased 25% or more.

War causes the greatest of waste. More than 500,000 articles are necessary for warfare. They come from crops and raw

[1] Map shows the resources and industrial centers of Germany, Austria and Hungary during the last World War.

[2] Germany's exports in 1929 amounted to $5,393,000,000 and her imports to $5,379,000,000.

German Imports in 1929
(in million dollars)

Cotton	316
Wool	310
Flax, hemp, jute	76
Foodstuffs	260
Oil seeds and oil cakes	260
Cereals	286 (wheat 242)
Yarns	258 (cotton 97, wool 97)
Milk, butter, cheese	220
Lumber	200
Not noble metals	264
Ores and metal ashes	184
Coffee	124
Fruits	172
Hides, pelts	162
Mineral oil	108
Fats	148
Woven materials	148
Meat, bacon	86.5
Resins and rubber	82

Blackstone Studios

THE AUTHOR

Ernst Berl was born in Freudenthal (formerly Austria) in 1877. He was trained as a chemical engineer at the Technical University of Vienna and received his Ph.D. from the University of Zurich in 1901. Following a term on the faculty at Zurich, he served as chief chemist of a rayon factory in Tubize, Belgium, and in 1914 was appointed chief chemist of the Austro-Hungarian War Ministry, serving for the duration of the first World War. He then became professor of chemical technology and electrochemistry at the Technical University of Darmstadt, leaving in 1933 to take his present post at Carnegie Institute.

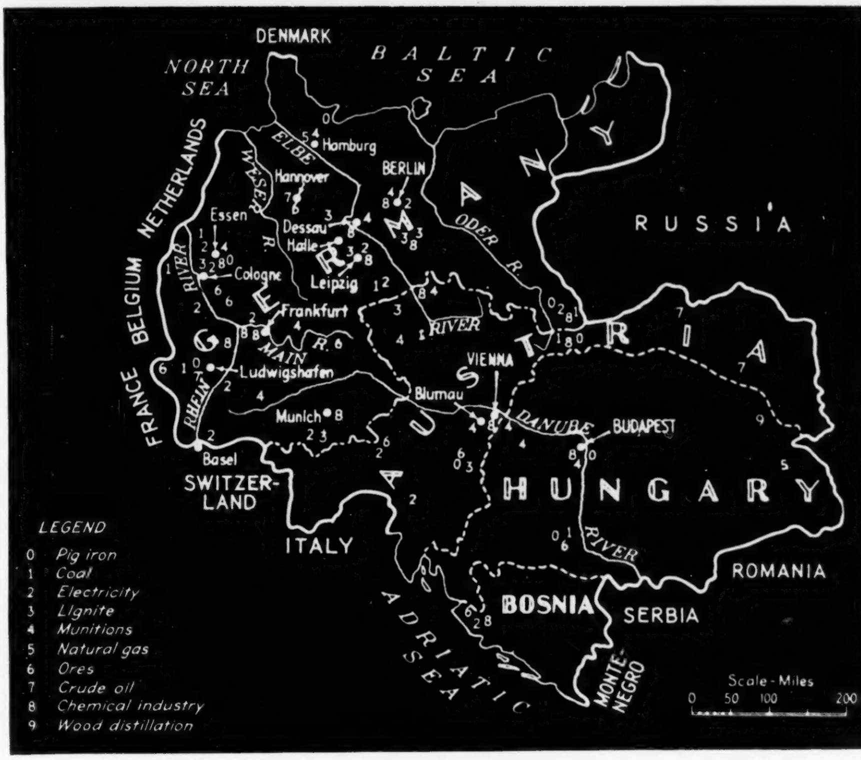
materials which are produced and extracted from the ground, from sea water and from the air. Labor converts the raw materials into final products. Production capacity and transportation determine output and consumption of the intermediate and final products, comprising battleships, airplanes, tanks, heavy guns, down to tooth brushes and matches. In order to produce these necessary articles, new systems of production have had to be devised in all countries, especially in Fortress Europe, because overseas goods are no longer available.

This war is fundamentally different from previous wars. The development of airplanes makes the second World War a real three-dimensional war. Long range guns are replaced by flying fortresses which transport large quantities of high explosives over hundreds of miles. This has been made possible by the development of the combustion engine and powerful new liquid fuels, of which the super, or high test aviation gasolines now play a great rôle. With this broad use of the combustion engine, fundamental changes in transportation go parallel. Transportation is speeded by surface ships and submarines with Diesel engines, by planes with enormous power concentrations, by tanks, self-propelled guns, and millions of trucks and jeeps. All of these require rubber and powerful liquid fuels in huge quantities. Fortress Europe has insufficient supplies of both.

The foodstuff situation in Fortress Europe is much less favorable than that of the Allies who have a large production of their own and have access to the granaries of South America. Europe having a moderate climate produces enough carbohydrates for foodstuffs and industrial use. It does not produce enough fats and proteins. According to Liebig's "law of minimum," minimum quantities of fats and proteins are required, together with carbohydrates, to form the necessary "fuel" for human and animal consumption. Northern Africa and Southern Italy produce considerable fats and proteins, which is one of the reasons their loss was a rather heavy blow to the Axis.

Fats are important not only for nutrition, but also for making glycerine for smokeless powders and dynamites. It is not known if the production of glycerine by hydrogenation of sugars, for example dextrose, is used in Germany on an industrial scale. Not enough cracking gases with three carbon atoms are available there to produce large quantities of glycerine. Germany and Czechoslovakia were large sugar exporters before the war. It is not known if wood sugar and alcohol production by the Willstätter-Zechmeister (Bergius) process or the Schoeller process is used in Europe on a large scale.

Synthetic fats can be produced from coal and from oil. The situation for the production of synthetic fats, however, is



Resources and industrial centers of Germany, Austria and Hungary during the last World War

similar to that for the production of liquid fuels from coal and carbon monoxide. The production of these synthetic products under present conditions can be carried out only with a large expenditure of material and manpower. Four to five tons of coal are necessary for the production of one ton of synthetic fuel, and five to ten times more working hours have to be spent for the production of synthetic gasoline from coal than is necessary for the production of the same amount from petroleum.

The production of "ersatz" with its high manpower requirements is one of the causes of the labor shortage in Fortress Europe. Germany up to now has lost 7,000,000 men in dead, permanently disabled and prisoners of war. In Germany proper there are 9,000,000 to 12,000,000 prisoners of war and workers from conquered countries utilized as slave labor. About 4,000,000 of these unfortunates are directly active in war industries. It is obvious that the efficiency of this slave labor is less than 50% of what it would be if the same men could work in freedom in their own countries.

As to raw materials, Europe is not as poor as is often believed. Tables I-a, I-b, and II[3] show the raw material situation in the year 1938 before military operations began. Some of the present production figures compared with those from previous years are fundamentally changed by the intensification of production. An interesting example is the production of aluminum and cement.[4, 5].

[3] These tables also show the production for non-European countries: U. S. A., Canada, Argentine, China and Japan with her conquered countries.

[4] Aluminum and Cement Production in Germany from 1931 to 1939

	1931	1932	1933	1934	1935	1937	1938	1939
Aluminum metal, thousands of metric tons	29.6				75.2		165.6	200
Per cent of 1931 production	100				254		560	675
Cement, millions of metric tons		2.9	3.93	6.63	8.81	11.7	12.6	15.6
Per cent of 1932 production		100	145	229	304	400	435	635

The per cent of increase of the U. S. production from Sept. 1939 to Sept. 1943 is no less spectacular: oil 66%, bituminous coal 40%, chemicals 300%, iron ore 125%, hydroelectric power 79%, steel 106%. The production of arms, planes, explosives and many other war needs increased thousands of per cent during these four years. The production of magnesium is now 10,000% of what it was in the latter part of the 1930's.

[5] War conditions in a besieged fortress are illustrated by the following production figures for Germany before and after the last war:

Iron	1913	19,800,000 tons (100%)
	1917	13,000,000 tons (69%)

This was in spite of the fact that Germany was in possession of the Belgian and French steel works and that practically no destruction by air raids took place.

Wheat, Rye, Oats, Potatoes, Sugar beets, Clover, Barley	1913	134,750,000 tons (100%)
	1918	82,503,000 tons (60.5%)

The conquest and military occupation of French North Africa, Sicily and southern Italy has the Reich already badly wounded. Grains[6], vegetable oils for human consumption and for lubrication of high flying planes[7], raw phosphates[8], mineral ores[9], sulfur[10], and other precious products from these conquered countries can no longer be shipped to Germany. The situation of the Reich would become desperate if the Balkans, including Roumania, with their wealth of raw materials could be occupied.

The transportation situation is of great importance. Table III shows figures for the rolling stock of the Reich and of Fortress Europe before Hitler came into power (1930). By occupying large territories, the transportation problem, which was neglected from 1933 until the war started because the German general staff believed, as in 1914, in a short war, became very difficult (see A + B + C in Table III). If the German armies have to give up large parts of the occupied territories and they move the rolling stock, as they certainly will, to the central part of their fortress, then the now rather difficult transportation situation will improve (see A + B + C in A + B and in A in Table III). The shifting of armies needs tremendous transportation facilities. Not many divisions can be shifted easily from Russia to Western Europe, the Balkans, France and other points of the next offensive of the Allies with this already overstrained system of transportation.

[6] 3,315,000 metric tons (1930) production in North Africa.

[7] 44,000 metric tons (1930) production in North Africa.

[8] Production of phosphate rock in millions of metric tons:

	1930	1938
Algiers	.876	.584
French Morocco	1.61	1.447
Tunisia	3.33	1.934
Total	5.816	3.965

This compares with 3,800,000 metric tons U. S. A. production and 3,000 metric tons in Germany.

[9] 232 metric tons nickel in French Morocco.

[10] 376,900 metric tons sulfur production in Sicily (1938).

The Chemical Picture

For the chemist the following picture may be of interest. The pillars of the chemical industry are acids, salts, coal, oil and metals. The situation for the production of sulfuric acid in Germany proper is rather unfavorable. Lack of brimstone and pure pyrites of her own force the costly production of sulfuric acid from gypsum with cement as a byproduct. The loss of sulfur from Sicily may be felt rather soon (importation in 1934 was 53,000 metric tons). Germany proper has rather large deposits of pyrites mixed with zinc blend in Meggen near Cologne. This ore presents certain difficulties in the production of roast gas and sulfuric acid. Smaller deposits of pyrites and other sulfur-containing ores are found in Austria and Czechoslovakia. The main pyrites-producing countries in Europe are Norway, Finland and Spain. Italy, also a main producer, is now out of the orbit of Germany (418,000 tons of pyrites were produced in Germany, 1,592,000 metric tons were imported in 1938; self-sufficiency is 22%). Successful efforts have been made in Germany, as is done in this country, to convert sulfur in coal into sulfuric acid for formation of $(NH_4)_2SO_4$.

Ammonia and nitric acid used for explosives and for fertilizers, due to the large capacity of German nitrogen plants, are at the disposition of the German war machine in practically unlimited quantities. No bottleneck is to be expected now, as in the last war, due to lack of nitric acid. Hydrochloric acid is also produced with ease from the large salt deposits. The chlorine production in Fortress Europe is relatively small compared with the U.S.A. production. This is due mostly to the higher cost of electric power (exception is Norway).

Germany has no deposits of her own of phosphates but is now in possession of the Lorraine and Luxemburg Minette iron ore deposits with about 2% bound phosphorus. In 1938 France produced 10,000,000 tons and Luxemburg 7,600,000 tons of iron ore. Part of the former and the latter furnish interesting amounts of citrate-soluble phosphoric acid in form of Thomas slag (831,500 metric tons of phosphate rock, 980,375 tons of basic slag and 86,200 tons of superphosphates were imported into the Reich in 1934). The loss of phosphate rock from Tunisia, French Morocco and Algeria, as already mentioned, is a hard blow for Germany's agriculture.

The Reich in peacetime met its iron requirements about 25% with its own ore, 50% with imported ores, and 25% by the

Table I-a—War Material Production of the Belligerent Nations, 1938.
(In millions of metric tons.)
(Data from the Statistical Yearbook of the League of Nations, 1941)

	Coal	Lignites	Crude & Synth. oils(s)	Pyrites	H_2SO	Iron ore	Pig iron ferro alloys	Steel	Cu ore Cu cont.	Cu	Lead ore	Lead	Zn ore	Zn metal
Germany	186	195	9 (s)	.465	2.05	3.1	11.82	22.9	.03	.03	.08	.089	.22	.192
Austria	.2	3.34	.58	.1	.55	.9				.002	.096	.011		
Czechoslovakia	15.8	14.72	.026				1.23	1.76			.004	.005		.009
Hungary	1.04	8.3				.65	.34	.65						
France & Luxemburg	46.5	1.06		.15	1.18	11.6	7.5	7.5		.001	.004	.44		.062
Belgium	29.6						2.43	2.3		.066		.088		.209
Netherlands	13.5				.48		.28							.025
Denmark														
Norway				1.03		.97			.02	.021				.046
Finland				.10					.015	.014				
Yugoslavia				.15		.30		.22	.99	.042	.018	.009	.042	.004
Greece & Cyprus		.11		1.021							.005	.009	.008	
Bulgaria														
Roumania	.3	2.1	5.2			.07	.133					.006	.004	.004
Poland	38.1		.5	.092		.27	.97	1.54			.005	.019	.07	.111
England	230.7				1.06	3.62	6.87	10.6			.03	.010	.012	.056
Sweden				.19		8.41	.714	.97		.01	.009		.035	
Spain				2.73		1.18	.4	.46	.03		.034	.032	.03	.008
Portugal				.558										
Italy	1.5	.87	.02	.93	1.09		.93	2.31			.04	.044	.09	.034
Russia	133		31.5	.98		13.5	14.6	19.1	.11	.107	.08	.075	.09	.08
United States & Cuba	358		214	.565	4.5	73.8 (1940)	40	55	.661	.698	.505	.44	.469	.42
Canada	9.82	3.15		.041		.76	1.17		.28	.26	.19	.17	.173	.16
Argentine					2.5						.024	.014	.04	
China	27.1					1	.2	.06						
Japan & conquered countries	45.56	.11	10.41			.2	3.01	5.93	.077	.104	.01	.012	.022	.055
World	1232	240.5	304	9.8	16.0	88	102	136	2.2	2.2	1.78	1.71	1.88	1.59

use of scrap, mostly from foreign sources (21,581,000 metric tons iron ore and 1,675,000 tons of steel were imported in 1938; self-sufficiency 34%). Germany has her own iron ores. Certain deposits contain some arsenium, the presence of which presents difficulties in using these ores in blast furnaces. Low grade iron ores with iron contents of 8-25% containing large amounts of silica are found in the Salzgitter district. They are now concentrated, using the English "Brassert process." Enriched iron ore with at least 28% iron content results. This is the minimum iron content for the German blast furnaces. These processes are connected with great expenditures in coal, apparatus and man power. Sintering processes with magnetic separation yielding sponge iron have left the experimental stage.

The Austrian Erzberg furnishes a rather pure iron carbonate. No coking coal is mined in Austria. The coke has to travel to the blast furnaces in Styria from the Ruhr and Czechoslovakia. This is a serious handicap. Very little, if any, of the most valuable Spanish iron ores from Bilboa, Rio Tinto and Huelva can reach Germany. Those Spanish ores contain 3-4% copper. Large amounts of iron ore reach the Reich from Norway and Sweden. The latter contain up to 64% of iron. In summer these ores are transported through the Baltic but in winter when the Baltic is frozen Swedish ore has to travel through Norway and must be transported over the hazardous route

Table I-b—Foodstuffs, Fiber and Sugar Production, 1937.
(In U. S. bushels, pounds and gallons.)

(*Data from the Statistical Yearbook of the League of Nations*, 1941)

	Italy	*Germany*	*Russia*	*U. S. A.*
Production in bushels				
Wheat				
Total Production	227,540,000	165,000,000	1,137,700,000	627,570,000
Per capita	5.33	2.5	6.75	4.8
Barley				
Total Production	9,200,000	156,400,000	377,200,000	151,800,000
Per capita	.20	2.33	2.25	1.2
Rye				
Total Production	5,305,000	290,820,000	841,020,000	27,510,000
Per capita	.13	4.33	5	.2
Oats				
Total Production	34,450,000	392,730,000	1,260,870,000	792,350,000
Per capita	.8	5.8	7.5	6.2
Maize (corn)				
Total Production	119,668,500	No production	110,040,000	1,532,700,000
Per capita	2.8		.67	12
Potatoes				
Total Production	97,255,000	1,702,880,000	2,560,660,000	330,300,000
Per capita	2.25	25.4	15.2	2.6
Production in pounds				
Cotton				
Total Production	4,630,000	No production	1,697,850,000	5,931,450,000
Per capita	.1		10.1	46.3
Wool				
Total Production	35,560,000	39,820,000	199,400,000	447,700,000
Per capita	.8	.6	1.2	3.5
Sugar				
Total Production	661,380,000	3,532,430,580	4,410,000,000	3,350,992,000
Per capita	15.3	52	26.25	26
Production in gallons				
Milk (including goats' milk)				
Per capita	30 (1930)	102 (1934)	35 (1935)	95 (1935)

Table I-a (Cont.)—War Material Production of the Belligerent Nations, 1938.
(In thousands of metric tons.)
(*Data from the Statistical Yearbook of the League of Nations*, 1941)

	Sn metal	Bauxite	Al metal	Cr ore	Ni	WoO_3	Cd	Sb	Hg	Vd	Mo	Mn ore	Phosphate rock
Germany			} 240		.6		.432						3
Austria								.25				.04	
Czechoslovakia								1.25	.10			.11	
Hungary		540.2										.02	
France & Luxemburg		683.4	50				.116	.824					40
Belgium	3.1						.270						32
Netherlands	14.8	(Sn mines now under Japanese control)											
Denmark													
Norway			15		1.06		.208				.46		
Finland													
Yugoslovaia		406.4	2.8	28				5.8					
Greece & Cyprus		180		24.8				.033					
Bulgaria													
Roumania												.06	
Poland							.244					.012	13
England	2		35			.26	.125						
Sweden						.18						.006	
Spain						.50			1.38				25
Portugal	.8					2.81		.27					
Italy		361	40		.2		.069	.93	2.32			.048	
Russia			55	96	3				.27			2.27	1790
United States & Cuba	3.8	442	187	23.8	.4	2.76		.6	.62	.95	15.6	} .027	3800
												.123	
Canada			110		95		.004	.01					
Argentine	2.9					.87						.58	
China	11.25					13.4		7.8					
Japan & conquered countries	34.3		35			2.0		.215	.02			.068	
World	178	4140	802	583	110.5	21.5	4.05	41.6	5.4	3.5	16.7	4.63	12124

Table II—World Foodstuff Production, 1930.
(In thousands of metric tons.)

(Data taken from Herder "Die Welt in Mass und Zahl")

									lbs. per capita						
	Rye	Oats	Wheat	Barley	Potatoes	Sugar Beets	Rice	Population 10^6	Rye	Oats	Wheat	Bar.	Pot.	Beets	Rice
A															
Germany	7680	5656	3790	2860	47000	14920		65.00	260	190	126	97	1600	505	
B															
Austria	480	330	300	217	2716	980		6.70							
Czechosl.	1833	1494	1444	1395	10710	6210		14.73							
Hungary	800	683	2040	411	2170	1607		8.68							
A + B	10193	8163	7574	4883	62596	23717		95.11	235	189	174	113	1450	535	
C															
Luxemburg } France	743	4400	6290	990	13430	8915		41.94							
Belgium	502	493	370	72	2750	1945		8.06							
Netherlands	315	374	135	76	2580	1864		7.92							
Denmark	770	1034	285	1083	1010	1105		3.55							
Norway	26	98	20	107	770			2.81							
Finland	375	600	32	130	785	31		3.63							
Yugoslavia	200	285	2186	404	1630	795		13.93							
Greece	40	75	288	169				6.20							
Bulgaria	344	145	1590	412		313		6.01							
Roumania	464	1156	3560	2370	1740	703		18.03							
Poland	6960	2350	2240	1464	30900	4970		31.10							
Lithuania	630	385	290	220	1810			2.20							
Latvia	413	340	100	177	1006			1.90							
Esthonia	264	155	34	124	820			1.11							
A + B + C	22839	20053	24994	12681	121828	44317		243.52	207	182	130	114	1100	405	
England } Ireland		2942	1180	970	6905	3220		49.15		132	53	43	310	144	
Sweden	1000	1050	600	220	1600	1165		6.14	358	377	216	79	575	418	
Spain	525	765	3873	2200	4195	2467		23.82	46	71	358	204	386	228	
Portugal	123	112	368	58	345			6.66	41	37	122	19	114		
Italy	155	535	5740	243	1945	3020		41.15	9	29	308	130	1040	160	
Russia (total)	20120	16610	20110	7350	47850	9500		161.2	275	227	275	100	650	130	
U. S. A.	1276	20350	23160	7095	9830	8323		123	25	365	415	127	176	150	
Canada	842	6620	10774	3004	2230	441		10.4	178	1410	2300	640	475	95	
Argentine	112	990	8360	350	880			11.2	22	195	1640	69	172		
China	18000						35000	478.1							162
Japan & conquered countries							31400								344

Table III—Railroads in Germany and Fortress Europe, 1930.

	Locomotives	Freight cars	Passenger cars	Miles	Locomotives	Freight cars	Passenger cars
		(in thousands)				per thousand miles	
Germany A	24.01	681.78	66.06	35.5	.68	19.3	1.86
Austria	2.46	39.42	6.10	4.2			
Czechoslovakia	4.21	110.12	8.93	8.6			
Hungary	2.0	40.0	2.50	5.9			
B	8.67	183.54	17.53	18.7	.465	9.8	.94
France	20.6	539.25	54.0	34.5			
Belgium	4.35	122.18	9.14	6.9			
Netherlands	1.44	33.29	5.16	2.3			
Denmark	1.05	17.71	2.69	3.3			
Norway	.60	13.37	1.23	2.4			
Yugoslavia (estm.)	5.0	130.0	11.0	16.3			
Bulgaria	.50	14.0	1.5	1.8			
Roumania	2.19	52.34	2.67	6.9			
Poland	5.22	150.93	11.93	15.0			
Greece (estm.)	4.5	125.0	10.5	16.7			
C	46.51	1198.07	109.82	106.1	.464	11.3	1.03
A + B	32.68	865.32	83.59	54.2	.605	16.0	1.59
A + B + C	79.19	2063.39	193.41	160.3	.493	12.9	1.21
A + B + C in A + B	79.19	2063.39	193.41	54.2	1.46	37.2	3.58
A + B + C in A	79.19	2063.39	193.41	35.5	2.82	58.3	5.45

along the Norwegian coast to German ports. These sources of valuable raw material for the Reich will probably be closed in the near future.

Germany produces very little copper from her own ores. In the center of Germany at Mansfeld a poor ore with 0.5-2.5% of copper is found (in 1938, 325,000 metric tons of copper ores, rough copper and scrap with a total copper content of 214,800 metric tons were imported, 32,800 tons were produced; self-sufficiency 13%). Most of the copper is now replaced by aluminum, zinc, electrolytic iron and plastics

Germany has enough zinc of her own and in the western part of Poland. She is also a large producer of aluminum. Bauxite has to be imported from Hungary, France, Jugoslavia and Greece (1,675,000 metric tons imported in 1938). The importation of bauxite from Italy (from the former Austrian Istria) will be stopped soon. If another front could be established in Southern France, the most important bauxite deposits near Marseilles would be cut off. Processes have been worked out in Germany and elsewhere to extract alumina from clay but this alumina costs much more than that made by the conversion of bauxite mineral with the Bayer process.

The Reich is very short of non-ferrous strategic materials with the exception of magnesium (besides aluminum) for which an unlimited amount of magnesium chloride and magnesite from Austria is at its disposition. The former Austrian, now Italian, mercury deposit in Idria probably will soon fall into Allied hands. Germany does not produce tin (602 tons of ore and 13,470 tons of scrap imported in 1934), chromium (77,000 metric tons of ore imported in 1934), nickel (33,700 metric tons of ore and 4,500 tons of scrap imported in 1934), tungsten (4,305 metric tons imported in 1934), vanadium and molybdenum. Small amounts of manganese are produced in Austria. With the military progress in Russia the manganese mines in Nicopol in the Southern Ukraine will no longer furnish this important material for steel production in Germany (Germany imported 1,165,000 metric tons of manganese ore in 1938).

The production of wood pulp for nitration, rayon and staple fiber is carried out in sufficient quantities and pulp is imported from Finland, Norway and Sweden. Relatively large amounts are produced with the nitric acid and nitrogen peroxide processes in Germany because sulfur for the bisulfite process is lacking.

Germany does not produce cotton, wool and other natural textile fibers. Importation of flax from Russia has stopped. Artificial fibers are produced on a large scale, but they are more costly than

(Turn to page 748)

Automatic Signal System For Process Departments

by J. R. ALEXANDER

Chief Electrical Engineer, Phosphate Division, Monsanto Chemical Co.

PLANT OPERATION

THE CONTROL SIGNAL CIRCUIT described here is being used in Monsanto's newest phosphorus-burning plant. An interesting application involves relays for interlocking motors on pumping units where spare and alternate units are used.

IN MOST industrial plants, signal systems to indicate operations are given relatively little study. Alarms are connected on, one after the other until there is general confusion when trouble occurs without indicating exactly the source. Often the failure of the signal and alarm circuit to operate properly may cost thousands of dollars and extensive delay in production. In such cases the signal system should be designed with as much care for detail as the main process equipment.

The phosphoric acid plant recently installed at the Trenton, Michigan, plant of Monsanto Chemical Company is a fully automatic and continuous operation. The system of signals and alarms installed in this plant covers nearly all types of devices generally found in process plants. For this reason a description of this installation, and an explanation of some of the circuits may be of interest to those either designing or operating such equipment.

The installation consists of a panelboard having twenty-seven signal units mounted on it, and suitable contact-making devices to operate these when an abnormal condition exists. Each signal unit on the panelboard consists of a red signal light, a white signal light, a momentary contact push button and two relays. Several industrial horns are connected to the alarm bus and are so located as to be audible in all parts of the department. Diagram 1 shows how the lights, push button, and relays are connected to make an operating unit.

The following is an explanation of the signal unit circuit and is identical for all twenty-seven units:

When the "contact on device" closes either momentarily or maintained, Relay R closes and seals in through contact R1 and HR3, and the red light burns. The horns are energized through contacts R2 and HR2. If the abnormal condition continues, the operator presses push button PB causing horn relay HR to close and seal in through contact HR1, causing white light to burn and opening horn circuit by causing normally closed contact HR2 to open. HR3 is opened when HR is energized, causing relay R to be held in only by "contact on device." When normal conditions are established the "contact on device" is opened causing R to be de-energized opening R1 and R2 and dropping horn relay HR out to the normally de-energized position. If the disturbance causes a momentary closing of the "contact on device" the circuit seals in as explained above, but when the operator presses push buttotn PB, the red light goes out and the horns are de-energized, indicating that the trouble has righted itself. Any number of units can be connected to the horn wire without causing interference.

The following types of devices or apparatus are connected to the various units:

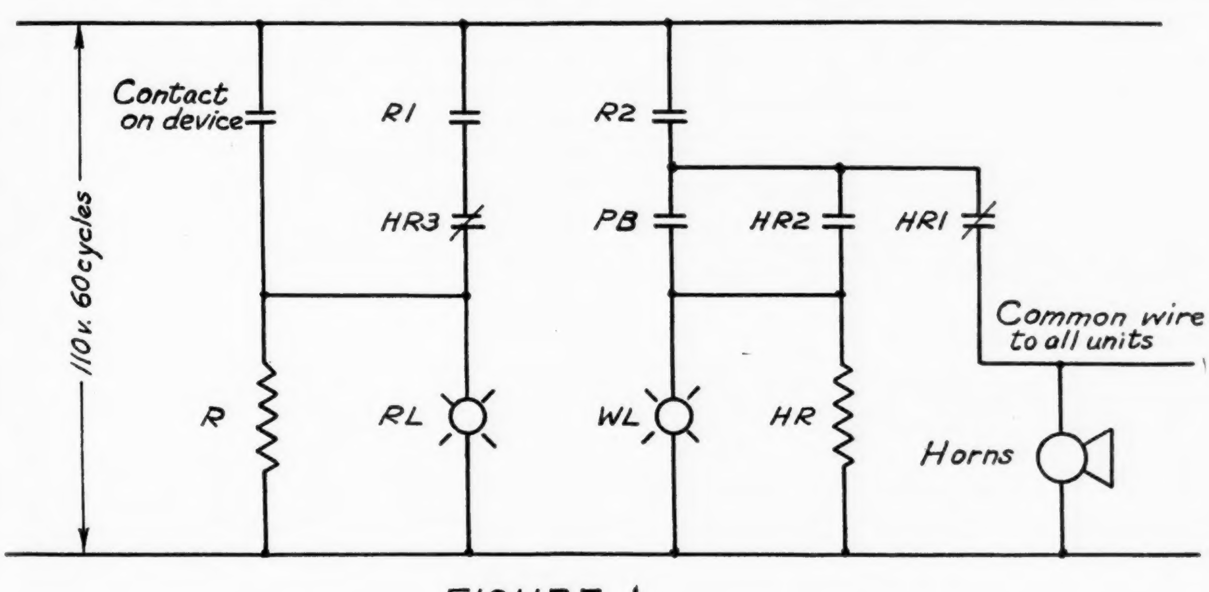


FIGURE 1

R—Relay actuated by contact on device; causes red light to burn and horns to sound.

HR—Horn relay actuated by push button; remains energized as long as contact on device is closed and causes white light to burn and horns to stop sounding.

PB—Push Button; actuates Horn Relay.

RL—Red light; indicates contact on device is closed.

WL—White light; indicates sounding of horns has been stopped by pressing of push button.

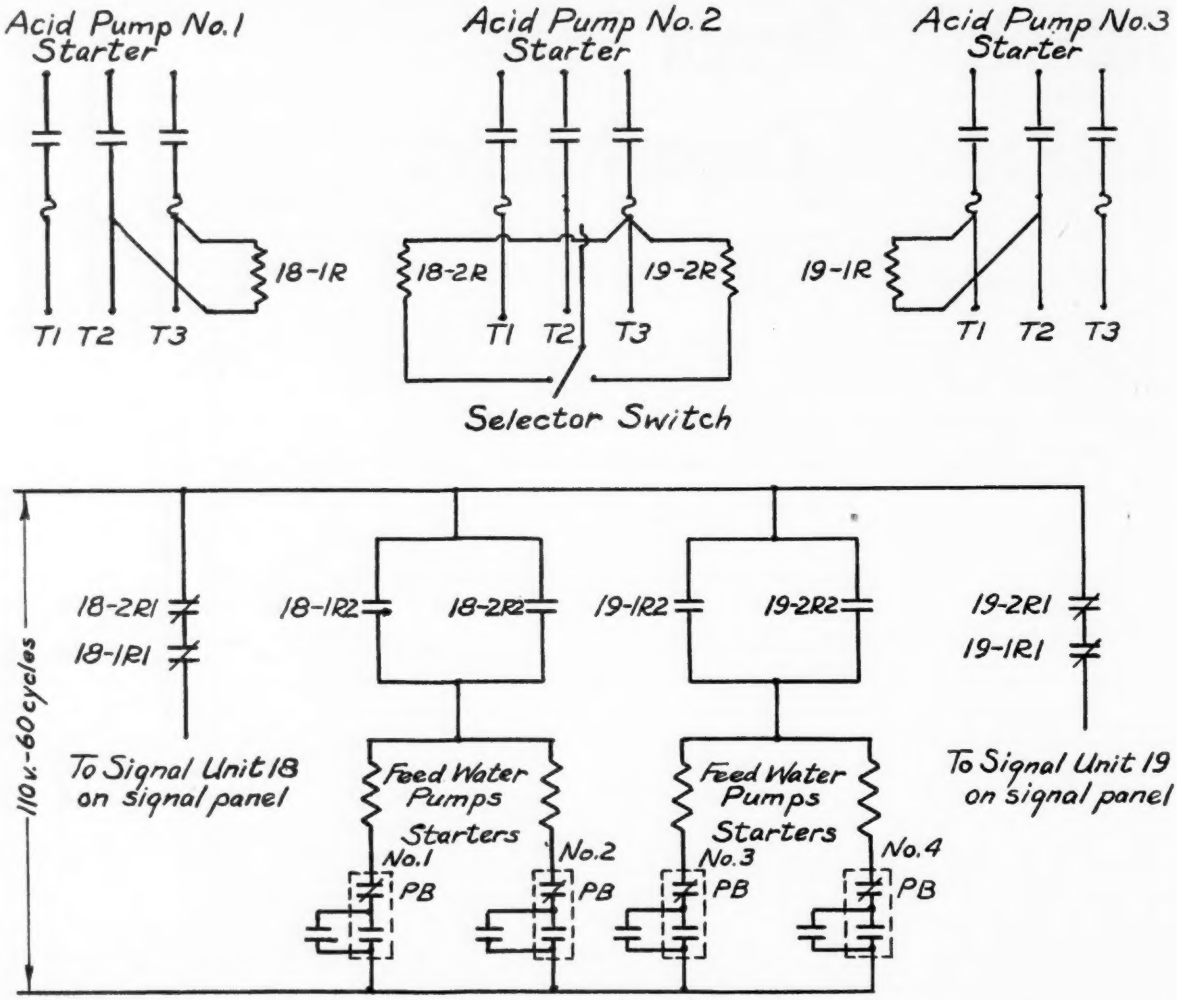


FIGURE 2

18-1R—Relay energized by Acid Pump No. 1; for energizing Signal Unit 18 and interlocking Feed Water Pump Starters Nos. 1 and 2.

18-2R—Relay energized by stand-by Acid Pump No. 2; for energizing Signal Unit 18 and interlocking Feed Water Pump Starters Nos. 1 and 2.

19-1R—Relay energized by Acid Pump No. 3; for energizing Signal Unit 19 and interlocking Feed Water Pump Starters Nos. 3 and 4.

19-2R—Relay energized by stand-by Acid Pump No. 2; for energizing Signal Unit 19 and interlocking Feed Water Pump Starters Nos. 3 and 4.

1. Air Pressure. Pressure switch which closes contact when pressure falls below set minimum.
2. Acid Pressure. Contact-making pressure gauge which makes contact when pressure is normal. A normally closed contact relay reverses action for connection to signal circuit.
3. Temperature. Contact-making thermometer closes contact when temperature exceeds set maximum.
4. Acid Level. Electrode which makes contact with acid surface when at operating level and operates through low voltage relay to close signal circuit when level falls too low.
5. Float Operated Switches. Indicate either high or low level in acid tanks.
6. Motors. A relay connnected across each motor's terminals and having normally closed contacts cause signal to be given when motor shuts down. This is probably the most positive means of indicating when a motor is running.
7. Vacuum Switch. This device is on intake to exhaust fans, and closes contact when suction falls below the set minimum.

Several of these signal circuits are also used for interlocking and sequence operation. Fig. 2 shows an interesting application involving relays for interlocking motors on pumping units where spare and alternate units are used. The acid pumps No. 1 and No. 3 are used in connection with two separate production units and the No. 2 pump is used as a spare. There are two feed water pumps for alternate use on each production unit, and these are so interlocked that an acid pump for the proper unit must be running before either of the feed pumps can be started. This is accomplished by means of the selector switch, which is single pole double throw. A study of this circuit will reveal that the selector switch must be in the correct position for the feed water pumps to run.

The electrical control engineer can readily adapt these circuits shown in Fig. 1 and Fig. 2 to almost any required signal and interlocking problem found in the usual job.

How To Fit Goggles

FULL USE of scientific safety devices and safety education is essential if the nation is to get the most out of its available reservoir of wartime manpower. In the chemical industries, as in many others, protection of the eyes is of major importance.

Safety goggles have been vastly improved since the start of production for war, but good goggles are not in themselves a guarantee of maximum eye safety. To get full protection from a pair of goggles it is important that they are properly selected and fitted. Uncomfortable goggles, improper goggles for the job, or goggles which do not fully suit the individual, tend to increase accident hazards and reduce productive capacity.

Proper selection and fitting of safety goggles is the subject of a new 16 mm. sound motion picture, "Right On The Nose," which is being made available to industry without charge by the American Optical Co., Southbridge, Mass. The purpose of the film is to demonstrate the proper procedure and technique for fitting non-prescription goggles. Screen time is 14 minutes.

One of the important sequences in the picture is that which covers the selection of the proper size goggles for the individual face. It is shown that if the worker is to enjoy comfort and retain full eyesight efficiency, adjustment of the goggles must be individual and skillful. The following points are emphasized:

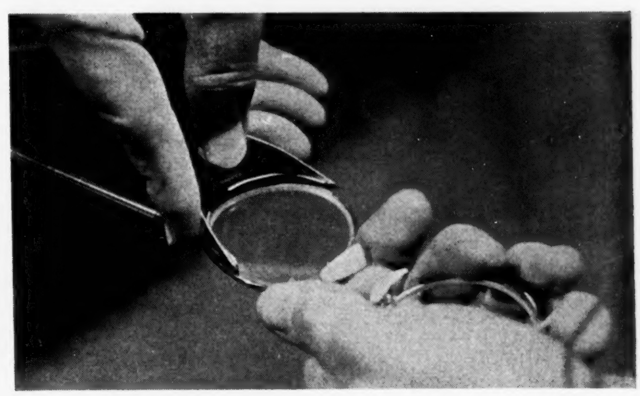
1. Goggles should be properly adjusted at the temples.
2. Goggles should be straight, fitting evenly across the face.
3. Temples should fit snugly but comfortably about the ears.
4. The bridge or nose-pads should be properly adjusted so as to rest against the solid bone of the bridge of the nose without pinching.

Fitting of nose-pad, saddle-bridge and eye-cup types of goggles are covered in the picture.

When adjustment of earpiece is needed, take out kink by exerting gentle pressure with the thumb . . .

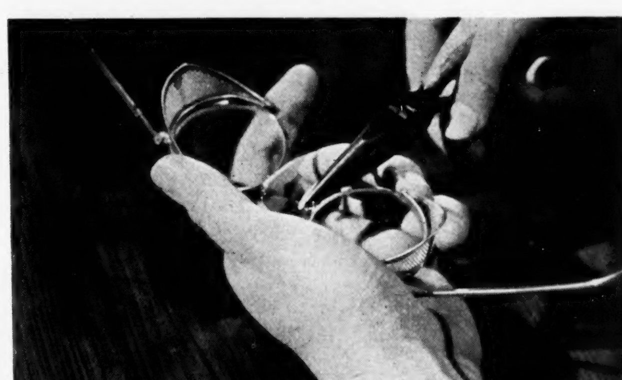
. . . then reshape and put the kink where you want it.

Goggles too wide. Eyes do not look through center of lenses.



In eye-piece adjustment, use gentle pressure with thumb, fingers acting as a brace.

Headband should be worn above ears and low at back of neck.



A pair of truing pliers makes it easier to adjust the bridge.

Water Dispersible and Bulking Gums--I

GUM ARABIC

by CHARLES F. MASON, Consulting Chemist

Gum arabic tear on tree

THE CURRENT AVAILABILITY of some of the natural gums makes them worth considering for broader use as raw materials in the specialties field and as alternates for similar but less plentiful materials. This is the first of a series of three articles by Dr. Mason on water dispersible and bulking gums.

UNDER THE STRESS of war conditions many producers are seeking substitutes for temporarily restricted war materials. For this reason, it is felt that a description of the origin and properties of some of the plant products loosely known as "gums" may be of value since certain of these are still available. Also, apart from consideration as substitutes, it would seem that some of these gums deserve greater attention than they are getting from the standpoint of their suitability for application in newer fields and as raw materials for new chemical products.

The gums to be described in this series have been given the title of "water dispersible and bulking gums" to emphasize a property which all others do not possess. The term dispersible is used rather than soluble, because such gums do not form true solutions but are suspended in a finely divided colloidal state and show distinct colloidal properties.

Some form smooth, easily flowing dispersions in water over a wide range of concentrations, while others form flaky non-homogeneous ones at low concentrations. Generally speaking, it is only in the last two decades that these products have been receiving any attention from physico-chemical researchers and then principally from a colloidal point of view even though one of them, namely gum arabic, has been known and used since before the Christian era. It is strange indeed that the useful properties of these substances are only now coming to light, especially when some of the non-water-dispersible gums, notably rosin, have been converted into modified synthetics with gratifying results.

Gum arabic is gathered from a tree known as Acacia Vereb or Senegal, of which there are about 400 species, about 25 of which grow wild in the Anglo Egyptian Sudan and the French Senegal sections of Africa. Some trees are now cultivated in gardens, all of which, cultivated and wild, grow to a height of eight to ten feet. When three years of age or over they are tapped after the rainy season, and gathering is conducted about once each week from November to June.

The native gatherer first makes a wound in the bark of the tree, and on weekly visits thereafter picks off tears or large droplets of gum. Strange to relate, healthy trees which can reach a plentiful supply of water produce no gum. They heal their wounds quickly and continue to leaf out; hence the theory that the gum is the result of infection of the wound.

Between 15,000 and 20,000 tons of gum arabic are gathered yearly, of which about one-fourth reaches the United States. Since the material is a natural product, the properties of successive shipments may vary to some degree, and processing and use must be largely on an empirical basis. Although the gum possesses properties which would place it in the class of carbohydrates, the high percentage of metallic elements in the ash

Table I—Properties of Solid Gum Arabic

	Acacia Pycantha	*Acacia Lorida*
Moisture	13.55%	15.34%
Ash	0.92%	2.59%
Elements in ash	Calcium, Magnesium, Iron, Potassium, Manganese	Calcium, Magnesium
Solubility in water	0.64% insolubles	0.98% insol.
Reaction	Acid	Acid
Degree of acidity (one investigator)	1000 gm. dry gum neutralized by 2 gm. dry caustic potash	
Degree of acidity (second investigator)	19.90 cc. of 0.01 normal caustic potash neutralized 1 gm. of arabic when dispersed in 100 cc. of water	
Preservative	0.10 to 1.00% sodium pyrophosphate or sodium benzoate or 0.25% formaldehyde	
Maximum solubility in water	1 gm. in 1.7 gm. water at 25° C. 1 gm. in 1.6 gm. water at 50° C. 1 gm. in 1.5 gm. water at 90° C.	
Behavior with borax in solution	Thickens	
Behavior with ferric chloride while dispersed	Thickens	
Nitrogen in crude gum	2.19%	1.51%
Nitrogen in acid after isolation	1.31%	0.71%

Tapping a Hashab tree

S. B. Penick & Co.

Sorting gum arabic

and the presence of a large amount of arabic acid led one investigator at the turn of the century to publish data which placed it in the class of a mixture of organic salts. The exact chemical composition is still not known. Gum arabic has been and still is the subject of some research in the pharmaceutical field, although most of such work has been more from a biological than a chemical point of view. This article attempts to treat the material from the standpoint of its industrial rather than pharmaceutical possibilities.

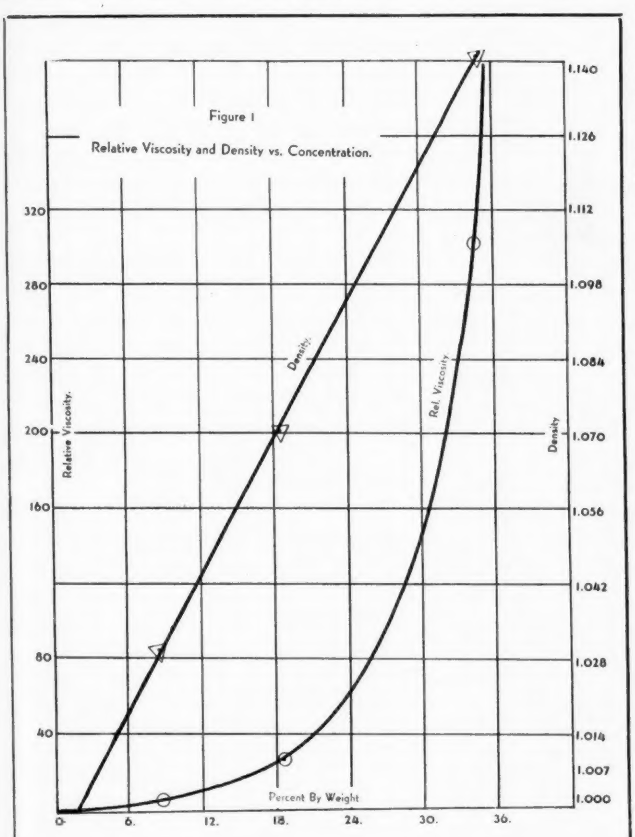


Table I gives some properties of solid gum arabic. The difference in moisture content of two samples is to be expected when one considers that humidity conditions vary from day to day in temperate zones and from hour to hour in the tropics. However, this is seldom taken into consideration when the average processor attempts to crush gum arabic to a fine powder or to make highly concentrated dispersions. Adding 10 lbs. of gum to 90 lbs. of water and stirring at an elevated temperature until all floating particles have disappeared will result in a dispersion of about 8.64% solids. A moisture content in the gum of over 20% is sure to lead to crushing and sifting difficulties, while under 12 to 15% moisture will result in a product which is friable and likely to dust or chip badly during handling.

The two values for degree of acidity given in the table represent reports by two investigators. When converted into comparable figures, they say in the first case that 1 gm. arabic is equivalent or neutralized by 0.002 gm. of caustic potash and in the second case by 0.011 gm. of the same base. One value is about five times as high as the other. This illustrates the lack of concordant results and is the reason for gums not being sold or identified by the acid number as is now becoming the practice with imported rosins.

Solubility

The figures for maximum solubility when converted to a more conventional scale are equivalent to 588 gm. in 1,000 gm. of water at 25° C., 625 gm. at 50° C. and 666 gm. at 90° C. In other words, a dispersion with 37% solids can be made at 25° C., but any excess will settle out upon standing. Such a dispersion would be highly viscous and useful in special cases.

The differences in nitrogen content, ash and moisture contents are of little significance from a practical point of view, but they prove statements made earlier about the varying properties in successive shipments and precautions necessary for uniform results.

Table II—Relation of Concentration of Water Solution of Gum Arabic to Density and Viscosity

Percent Gum by Weight	*Density gms./cc.*	*Absolute Viscosity*	*Relative Viscosity*
1.22	1.000	0.0132	1.65
2.10	1.003	0.0160	2.00
2.70	1.006	0.0184	2.30
3.85	1.010	0.0234	2.92
3.95	1.011	0.0235	2.93
4.77	1.014	0.0259	3.23
5.54	1.017	0.0287	3.59
7.33	1.024	0.0390	4.87
8.55	1.029	0.0440	5.50
11.73	1.042	0.0707	8.84
15.68	1.050	0.0959	11.99
16.48	1.062	0.1400	17.50
18.69	1.071	0.190	23.70
34.92	1.141	2.410	300.00

The data in Table II are those of R. Taft and L. E. Malm. They are plotted

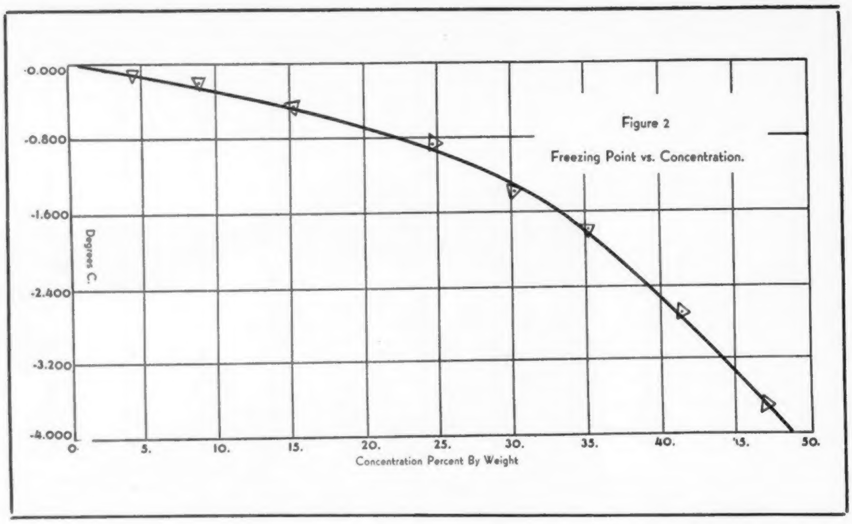


Figure 2
Freezing Point vs. Concentration.

in Figure 1. Relative viscosity means viscosity in relation to that of distilled water at the same temperature, the distilled water viscosity being given the value 1.00. It is obvious that columns one and four are not related to one another according to any of the simpler laws of mathematics. Any relation which exists would have to be expressed in the form of a complicated empirical equation.

The sharp rise in relative viscosity between the last two samples is interesting but not a novelty. It should be of use to those processors who use arabic dispersions only for increasing the viscosity of their product, as they may now be using much more than is necessary.

The density figures are expressed in grams per cubic centimeter. Here again, there is not simple relationship between concentration and density, so it would be cumbersome to attempt to express it in the form of an equation.

Table III—Changes in Specific Gravity and Viscosity of Gum Arabic Solution with Changes in Temperature

Percent by Weight	*Temp. Deg. C.*	*Density gms./cc.*	*Relative Viscosity*
9.09	0	1.197	7.17
9.09	15	1.034	6.57
9.09	30	1.031	5.97
9.09	45	1.025	5.48

It is obvious that with each increase in temperature there is a decrease in specific gravity and relative viscosity—a behavior which is often met in similar systems and which is not unexpected. The figures under temperature coefficient indicate the average percent decreases per degree for each fifteen degree interval. This should be a hint to those who use gum arabic in making emulsions. A freshly prepared dispersion should be allowed to cool back to room temperature before adding the oil and homogenizing. At room temperature the viscosity will be near the maximum and close to the conditions under which the emulsion will be used. The thickening effect aids in emulsifying.

Table IV—Relation Between Concentration of Water Solution of Gum Arabic and Freezing Point

No.	*Percent by Weight*	*Freezing Point Degrees C.*
1	4.38	0.100
2	5.83	0.136
3	6.51	0.148
4	7.55	0.165
5	8.41	0.198
6	12.45	0.356
7	14.52	0.430
8	15.13	0.456
9	17.55	0.563
10	24.50	0.850
11	27.50	1.100
12	29.00	1.200
13	30.00	1.400
14	32.50	1.600
15	35.00	1.800
16	36.00	2.000
17	37.50	2.200
18	38.50	2.400
19	41.20	2.700
20	42.80	3.000
21	43.80	3.200
22	44.80	3.400
23	45.90	3.600
24	46.90	3.700

These data are plotted in Figure 2. From a scientific point of view they add further proof to the earlier evidence that gum arabic is not to be classed with the carbohydrates but with the organic salts, all of which have abnormal freezing points and conduct an electric current when dissolved in distilled water. These figures should be a hint to some producers who think that gum arabic dispersions do not need protection against freezing conditions. Once such a dispersion is frozen, and the water separates in the form of ice crystals, it can be brought back to the apparent original condition by raising the temperature above the freezing point, but the viscosity of the thawed-out product will be affected and restirring may be required. Also, it may be impossible to reproduce the original viscosity.

Since gum arabic is a plant product, it ferments rapidly after being dispersed in water and most rapidly at high temperatures, resulting in molds which appear first upon the surface and later sink to the bottom. The pH or degree of acidity of a five percent solution decreased six percent in three months at room temperature. Refrigeration conditions lessened this tendency to some extent. This illustrates the necessity of using the correct preservative in the correct concentration (see Table I).

The complete insolubility of gum arabic (either in crude form or the variety which is purified by precipitation with alcohol from an aqueous dispersion), in organic solvents restricts its use to a degree. The only solvents found to date are glycerol and ethylene glycol. Recent investigations of the emulsifying power of arabic with oils from the point of view of particle size have failed to throw much light upon quantitative relations of gum to oil or the nature of the oils. This phase of gum application is still in a primitive state, and the only general statements that can be made are that homogenizing is superior to shaking, and gum emulsions of oil and water are more stable than those with soap and oil in water. Moreover, those with gum are influenced less than those with soap by addition of salts and by changes in temperature, even though the emulsified particles are coarser.

The principal fields of use of gum arabic have been pharmaceuticals, confections, textiles, adhesives, food syrups, the sizing of paper and textiles, lithographing, and the production of matches. In all of these fields the material has been used because of the adhesive and bulking properties of its dispersions in water. It is strange that gum arabic has not been the subject of many patents. Only one is listed since the turn of the century. It covers incorporation of the gum with alkaloids as an anesthetic. The field is wide open for patents involving gum arabic, and useful derivatives of the material may be coming into the market after the war.

It is quite possible that in formulations using gum arabic a suitable substitute might be found for certain modified forms of shellac, a material which is not abundant at present. For example, a dispersion of gum arabic in water may hold possibilities as a substitute for the water solution of shellac and borax that has been widely used in sizing.

The ammonium salts and organic amines are restricted in civilian use because of nitrogen requirements in explosives. In this respect, ammonium soaps which have been used for thickening might be replaced by gum arabic in water. The same may be said about the organic amines, which formed liquid soaps and were efficient emulsifiers.

In closing, the writer wishes to state that these are only suggestions and that the processor still has the responsibility of fitting the material to his own needs.

Martin H. Ittner

(*Continued from page 661*)

objectionable darkening. Ittner discovered that by incorporating in the soap a minute amount of certain phenolic chemicals, rancidity and color change were prevented.

Lessons drawn from wars and hazards of commerce prompted Ittner to turn to synthesis of many ingredients used in soap manufacture. Back in 1908 an eruption of Mt. Etna, together with an earthquake, injured the source of bergamot oil and destroyed oil in storage. In 1912, the Balkan war prevented the world's supply of attar of roses from leaving Bulgaria. ,World War I effected a similar reaction on a much broader scale. "Without any prophetic vision on my part," says Ittner, "I concluded long ago that our industry should be prepared as to the matter of substitutes for articles the supply of which might be restricted, and so we started research in this direction and began preparing similar chemical constituents from materials likely to remain readily available." These studies have extended to finding substitutes even for fats, the basic material of the soap industry. In this connection, and in view of the present furore for obtaining almost everything from petroleum, it may be said that the idea of manufacturing soap from petroleum is the subject of many patents by numerous inventors. Unfortunately commercial production of soap from petroleum is not so simple as these patents might imply. Many difficult problems arise in the transition from laboratory technique to commercial production; and both in pilot and production plants Ittner has exhibited true chemical genius in bridging the gap between theory and practice. Ittner and his staff have done a great deal of development work on production of soap from petroleum, and through their contributions a process is now available to the soap industry whereby large scale production from petroleum sources becomes possible upon loss of natural soap-making materials. Ittner's concrete and practical contributions to the soap industry were recognized by the trade itself in 1940, when the National Association of Manufacturers selected him as a Modern Pioneer.

Ittner, now 73, stands six feet two inches, is of ruddy complexion, and radiates the energy and enthusiasm that has marked his career. He was born at Berlin Heights, Ohio, being of the third generation of Ittners to reside in that state. His interest in chemistry was aroused through curiosity concerning the manufacture of bricks, this being the occupation of his father.

Before Ittner reached his 'teens, his parents moved to St. Louis, Missouri, where, after attending public schools, he entered Washington University in that city. Upon completion of courses there leading to the degree of B.Ph., and B.S. in chemistry, Ittner entered Harvard Graduate School to do research work in organic chemistry. In 1895 he received the degree of A.M., and in 1896 the same institution awarded him the doctorate. He has since received honorary degrees from Washington and Colgate Universities.

Ittner has contributed his services unstintingly to the several chemical organizations. He has been called the Thomas Jefferson of the American Chemical Society, in which he has been active since 1903, serving in turn on various committees, as councilor, and as chairman of the New York section. For over forty years he has been a member of the Society of Chemical Industry of London. He is also a member and past president of the American Institute of Chemical Engineers. He has served as president of the Chemists' Club of New York and of the Chemists' Building Company, and long as a trustee of both.

Though of a retiring nature, Martin Ittner is exceeded by few in the world of chemistry in the breadth of his circle of friends and in their regard and affection for him. The esteem in which he is held rests only in part upon his distinction as a scientist, however. His intellectual integrity. his loyalty, his outstanding work for his community, along with personal qualities which this writer cannot couch in words, endear him to all who know him.

As would be expected of a man of Ittner's physique, he is fond of outdoor life and enjoys the relaxation afforded by his frequent visits to his New Jersey farm. He is a lover of animal life and a botanist of no mean ability, which adds to the pleasure of his jaunts about his farm and in the woods in the company of his youngest son, now aged six. Fishing and hunting are his chief hobbies, and he has owned, bred and trained many fine dogs.

New Procedures of the National Roster of Scientific and Specialized Personnel

PUBLIC ANNOUNCEMENT has recently been made by the War Manpower Commission of revised policies and procedures in connection with the placement and transference of personnel, including professional and scientific personnel, as well as a change in the manner of advising local Selective Service boards concerning the qualifications and essentiality of professional and scientific workers in the war program.

These new regulations are embodied in Regulations 4 and 7 of the War Manpower Commission and Selective Service Local Board Memoranda 115, 115-B, and 149. Among the significant changes which affect professional and scientific personnel are:

Selective Service Activity and Occupation Bulletin No. 35, which established a national committee procedure and under which certain committees in the fields of physics, mathematics, chemistry, and engineering were organized, has been rescinded. This means that employers of professional and scientific personnel will no longer deal directly with the National Roster in connection with advice which heretofore has been sent by the National Roster directly to the local Selective Service boards concerning the professional qualifications and the essentiality of professional and scientific personnel in the work they are presently performing.

The new procedure is set forth in Local Board Memorandum 115-B as follows:

Referral to United Stated Employment Service.—(a) Local boards are directed that whenever, after the most careful consideration, they conclude a registrant who is alleged to be in a critical occupation in war production or in support of the war effort is not entitled to occupational deferment on the basis of his present employment, to refer the registrant's name and present occupation, together with a statement of his skills and qualifications and place of present employment, to the local office of the United States Employment Service in the area in which the local board is located.

(b) This reference is mandatory and will be accomplished—

(1) If no appeal is taken, upon the expiration of the period afforded the registrant to take an appeal following classification of the registrant in Class I-A, or

(2) if an appeal is taken, upon the return of the file to the local board with the decision that the registrant is continued in Class I-A on appeal.

(c) In all such cases, local boards will delay the issuance of an Order to Report for Induction to such registrant for 30 days from the date of referral to the United States Employment Service.

(d) If, during such 30-day period, the United States Employment Service certifies to the local board that—

(1) The registrant possesses and is fully employing the qualifications required of a critical occupation in war production or in support of the war effort and his removal from his present employment would adversely affect the maintenance of his employers required production, or

(2) The United States Employment Service has succeeded in placing the registrant in a critical occupation in war production or in support of the war effort with another employer who requires the registrant's skills and qualifications and will fully utilize such skills and qualifications,

the local board will delay the issuance of an Order to Report for Induction to such registrant for a further period of 10 days from the receipt of such certification so as to permit the filing of a new Form 42A requesting the occupational deferment of the registrant.

(e) In the event that either a Form 42A is filed by a new employer with whom the registrant has been placed or certification is received from the United States Employment Service stating that the registrant is necessary in his present employment, the local board will reopen the classification of the registrant and will consider the new evidence as a basis for further occupational deferment.

(f) If, however, no notification is received from the United States Employment Service prior to the expiration of the original 30-day period following referral or, in the event certification is made, that the registrant is needed in new employment but a Form 42A is not received before the expiration of the 10-day period allowed for the filing of a new claim for deferment, the local board may proceed with the induction of the registrant.

The War Manpower Commission has implemented the procedures set forth in

(*Turn to page 756*)

Preview of New Equipment at the Chemical Exposition

TECHNICAL MEN in the chemical and process industries look forward to the Exposition of Chemical Industries, held every two years in New York, as a source of information on new or improved equipment, instruments, materials, and processes. At this year's Exposition to be held in Madison Square Garden, December 6-11, some of the developments rising out of industry's tremendous wartime accomplishments will begin to make their appearance. In order to bring some of the new developments to the readers attention we present the following preview.

EVERY two years the Exposition of Chemical Industries brings together in New York the latest fruits of research and invention that have been brought to the point of commercial application for the chemical and process industries.

Since 1915, when the first of these expositions was held to help solve the handicaps created by World War I shortages, this chemical exposition has come to be an important clearing house of progress for the industry. To chemists and chemical engineers it has become known principally as a means of finding out what's new in plant and laboratory equipment, instruments and materials of construction.

The last chemical show, in 1941, came as the industry was getting its teeth into the task of production for the defense program. The show had hardly ended on December 6 when the country found itself at war the very next day, December 7. The industry had been so busy just prior to the last show that many felt exhibitors would not be able to devote much time to their displays. However the show proved very successful and those who attended derived much benefit from the new and improved equipment on display and from the exchange of information that the event provided.

In the two years that have elapsed since then the chemical and allied industries have overcome many obstacles and met the challenge of all-out war production. In doing so many new ideas, new techniques, instruments, materials and processes have come to the fore. The whole story of these new industrial tools has not yet been made available in detail and the job is by no means finished, but out of these two years, probably the busiest in the industrial life of the nation, have come innovations and improvements which should begin to make their appearance at this year's Exposition.

With the idea of bringing these developments to the attention of its readers CHEMICAL INDUSTRIES has contacted exhibitors of machinery, equipment, instruments, etc., asking them to give us information on the new developments to be displayed by them at the exposition. From the information obtained we have compiled the following descriptions of some of the exhibits. This compilation is by no means complete as many of those we contacted were involved in important war work and could not take time out to prepare the information. Some others reported that they were not displaying new developments but would have representatives and literature at their booths to provide information on new developments which they were not in a position to exhibit because of war demands.

Acme Steel Co.: Three types of the recently improved machines for wire stitching of cartons, drums, bags and similar containers used by the chemical industry will be demonstrated. The expanding use of fibre drums and bags, caused by shortages of other critical container material, has presented the problem of speedy closure and proper reinforcement. These are now claimed to be solved with Acme Silverstitchers which form and drive staples from a coil of wire mounted at the top of the machine.

The straight arm Silverstitcher is employed for stapling fibre drums and covers as well as sides and ends of cartons, display cards, etc. The bottom Silverstitcher is used to staple the bottoms of many kinds of containers while a special type of Silverstitcher is used for closing bags. All the machines are designed to handle two gauges of stapling wire without adjustment, have resilient one-piece feed wheels, silent V belt drive and many of the parts are reversible. Booth No. 314.

American Hard Rubber Co.: The feature of this exhibit will be a demonstration of what is being done to produce in synthetic rubbers chemical processing equipment for purposes which have required regular rubber compounds for a long period of time. The use of these synthetic rubbers, while under strict government control, has been allocated for certain purposes to replace the limited supply of crude rubber. By developing rubber compounds from synthetics, it has been possible to provide certain hard rubber and soft rubber substitutes of approximately equal physical and chemical characteristics. Considerable progress has been made in the application of these new compounds in the form of tank linings, pipe linings and all rubber pipe and fittings, as well as special equipment for chemical processing industries.

The company will also show various products made of Saran, a vinylidene chloride resin which has good chemical-resistant properties. Booth No. 513.

American Smelting and Refining Co. and the **Lead Lined Iron Pipe Co.** will

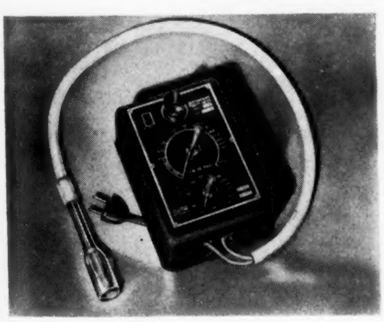
show an extensive display of lead linings on iron, steel, copper, brass, etc.

According to the company there will be two things worthy of special note. One concerns the subject of homogeneous lead linings on steel. Such linings applied to steel tanks and vats by the Asarco bond process are said to be of use when high vacuum, vibration, or high temperatures are encountered in chemical processes.

The other new feature of the display will be a patented tubing named "Tube-Loy." This product, extruded from an alloy, principally lead plus small quantities of calcium, magnesium and tin, was specifically engineered for use as underground water service pipe. The tubing is said to withstand cold water pressure up to 125psi, and to retain lead's ductility while possessing greater strength. Booth No. 524.

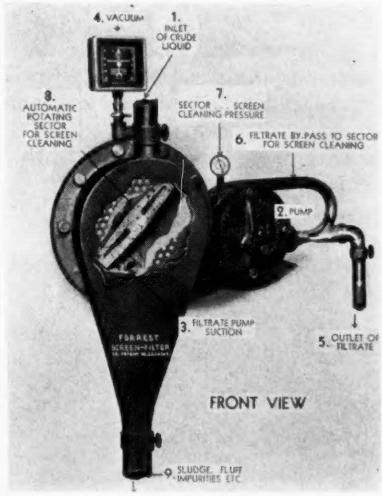
Baker Perkins, Inc., will display a modernized design of a laboratory mixing and kneading machine having working capacity of 3.5 gallons. The new features include a mechanical tilt; direct drive to front blade; higher strength rating. Optional features available in the new design include single stuffing box arrangement for high vacuum; pedestal-mounted cover, either vacuum, compression or combination vacuum and compression types. Booth No. 305.

Barnstead Still & Sterilizer Co., Inc.: A new unit for quick-checking the purity of distilled water will be displayed and demonstrated. This purity meter is a compact conductivity bridge which upon immersion of a dip cell in

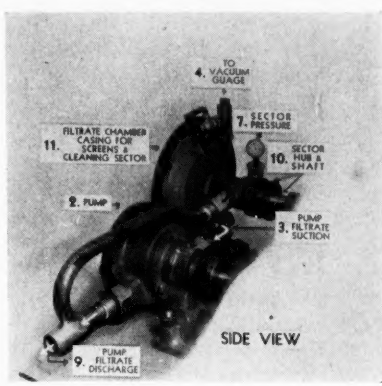


the water to be tested instantly indicates the purity by showing on a scale parts per million in terms of sodium chloride. Booth No. 108.

The Bramley Machinery Corp. will display the new Forrest continuous operating screening and filtering machine. As indicated in the illustrations the liquid to be purified enters at (1) into filtrate chamber (11). This chamber is separated from the crude product receiver by means of a screening-filtering unit, consisting of two perforated discs which hold a fine-mesh screen between them. The pump (2) draws filtrate via suction outlet (3) creating a partial vacuum in filtrate chamber (11), and discharging major portion of filtrate via outlet (5). A minor portion of the filtrate goes



through pipe (6) into hollow sector-shaft (10) and finally discharges under pressure via two openings of rotating sector (8). This portion of filtrate



back-washes and cleans the screening medium compelling sludge and impurities to give way and fall to bottom of receiver and finally is removed through outlet (9) without interrupting output and screening operation. Booth No. 322.

Bemis Bro. Bag Co.: The Aquatex Closure for multiwall bags, recently developed particularly to meet the needs of the U. S.Quartermaster Corps, will be displayed. This closure consists of a flannel-lined tape which is sewed on the top and bottom of the bag in place of crepe kraft tape which is ordinarily used. Both ends of the bag are dipped in amorphous wax. The flannel-lined tape acts as a wick and draws wax into the stitch holes, thus forming an effective barrier to the entrance of moisture and vapor.

Bemis will also display the various types of bags which they make for chemicals and those which have been developed especially for war needs. Booth Nos. 425-427.

Black-Sivalls & Bryson, Inc. will show safety head pressure rupture disc devices, combination relief valve units for gas and liquid service, and vertical vent valves for atmospheric and low pressure storage vessels. The vent valve to be exhibited has no internal guides, has unusually large discharge capacity for both pressure and vacuum, and is so designed that the pressure in the storage tank, up to the functioning pressure of the valve, actually keeps the valve tight and leak proof. Booth No. 621.

Blaw-Knox Co.: Flow sheets will be displayed and engineering data presented on many of the processes developed through Blaw-Knox engineering research. Some of these processes were developed in cooperation with government or private research groups. A simplified, pictorial flow diagram will illustrate the manufacture of synthetic rubber as carried out in the government copolymer plants designed and built by Blaw-Knox. Other systems and processes to be featured include solvent recovery and purification, resin manufacture, anhydrous ammonia and other volatile liquid handling, and high temperature processing. Booth No. 746.

The Edward G. Budd Manufacturing Co. will feature several new applications of the Budd-developed Shotweld system of resistance welding with a display of extremely lightweight stainless steel duct work. These pipes are used for handling poisonous and corrosive fumes and have been used to replace vitreous or heavy gage piping which required heavy supporting structures.

Other items featured in the Budd exhibit will be a model sectionalized chemical mixer in operation; absorbtion columns, dyeing spools, and bubble cap and chimney. Booth No. 6.

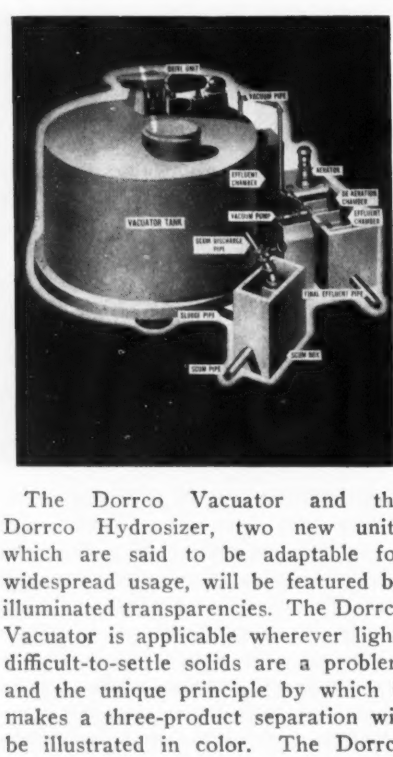
Corning Glass Works: New bacteriological filters in extra-fine porosities will be among the interesting new items in this exhibit of industrial and laboratory glassware.

The industrial part of the display will also include several examples of new developments in glassware. Recently, for example, Corning has broadened its fabrication of 96%-silica glassware for high-temperature use with a variety of products including piping, cylinders, jars, and tubing. These products will be on display as well as glass precision gages and accurate-bore tubing, and also new developments in the company's Pyrex line.

In addition to the bacteriological filters already mentioned, the laboratory section of the exhibit will include the new Corning ball and socket joint that facilitates the assembling of laboratory apparatus; new hex-base cylinders, beaded near the top, that won't roll; and a "Corad" distilling head for wet and dry distillations. This "Corad" unit, which has not been produced on a commercial scale before, will be in operation.

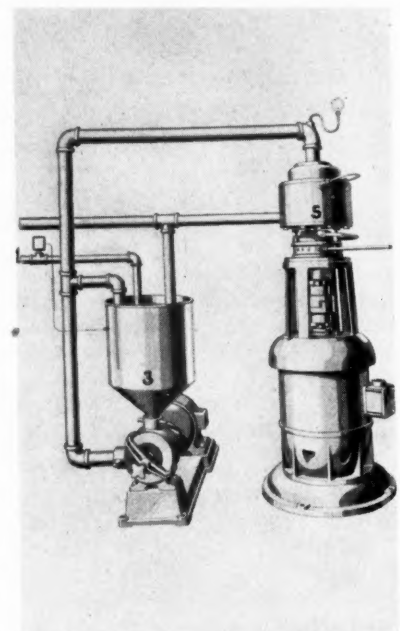
Other active displays will be a mechanical demonstration of the resistance of glass to thermal shock and an extraction apparatus for handling extra-large and bulky solids. Since the time of the previous Exposition of Chemical Industries in New York, Corning has produced a new line of "actinic" glassware for laboratory use. The products on display will include flasks, beakers, pipettes, and others. Booth No. 204.

The Dorr Co.: The Dorrco D-I System of Water Treatment, which is said to involve more efficient application of the proven principle of deionization, will be shown by means of a working model constructed of glass and lucite. New York City water will be fed to the model and as it passes through the cation and anion exchangers, the removal of metallic salts will be graphically illustrated by means of color change and a conductivity meter. The FluoSolid System, a new method of heat-treating solids, will also be shown by means of a working model of glass, in which operation will be clearly visible.



The Dorrco Vacuator and the Dorrco Hydrosizer, two new units which are said to be adaptable for widespread usage, will be featured by illuminated transparencies. The Dorrco Vacuator is applicable wherever light, difficult-to-settle solids are a problem and the unique principle by which it makes a three-product separation will be illustrated in color. The Dorrco Hydrosizer is an improved hydraulic classifier capable of delivering an extremely well graded series of products. The entirely new control equipment and design features responsible for its performance will be featured. Booth No. 303.

Eppenbach, Inc. will display a colloidal fuel mill developed by the Colloidal Oil Corp. This mill is an assembly, as shown in the illustration, used in the manufacture of colloidal oil that consists of 40 to 70% solid fuel and 60 to 30% liquid fuels. The



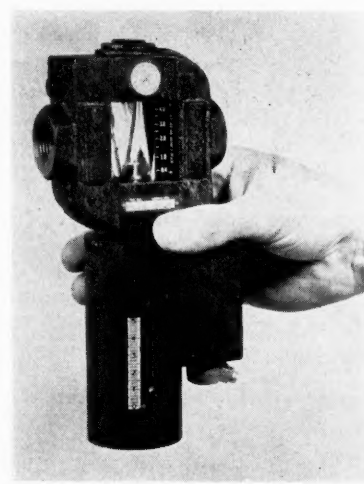
operation consists of reducing the solids to a fineness of 30 mesh and mixing with liquids. The mixture flows through pipe (1) into feed pump reservoir (3), and is then forced into an Eppenbach colloid mill (5), where the colloidization, temperature, pressure and power consumption are automatically controlled to deliver the specification colloidal oil. This unit is said to make possible the conversion of fine coal, asphalt, coke, mine slurry, tar, hard pitch, oil, molasses, etc., into consistencies where they are burned by existing Bunker "C" oil burning systems and burners. Booth No. 104.

Eutectic Welding Alloys Co.: This year the Eutectic booth will particularly stress the new developments and improvements in its line of low temperature welding alloys. Among these are the material-saving alloys known as "Durface," which are used for building up worn, corroded, or missing parts. These alloys have great hardness and can be applied with ease on machine parts and chemical equipment. Another improvement is Eutectic Alloy No. 183 and also Eutectic Alloy No. 30, used for copper welding with gas and arc. These rods are said to give a strong weld completely leakproof and corrosion resistant. Of further interest this year is the line of substitute alloys Eutectic offers to replace silver solders. Booth No. 403.

The Exact Weight Scale Co. will display a new electronically operated checkweighing scale. This scale will weigh to extremely close tolerances, at a high rate of speed. The company will also have on display a new Shadowgraph scale with electronically operated tare taking device. Booth No. 504.

Fischer & Porter Co.: This exhibit will feature the following:

Demonstration of the new Ultra-Stabl-Vis rotameter which will meter oils and chemicals of varying viscosity with calibration stable against such changes. Meters will be in actual operation showing no error for metering hot or cold oil with a viscosity spread of 400 S.S.U.



Rotamatic recording-controlling flow rate rotameter. Latest improved design with high power and low inertia controlling by pneumatic means a varying flow load. Includes new high accuracy Magna-Count integrator.

New Series 700 Master-Enclosed "Rotameter of Tomorrow."

New Rota-Sight Flow Rate Indicator and Rota-Sight Alarm.

New Magna-Bond Recorder will also be operated in conjunction with the Rotamatic. This meter carries the rotameter float position to the outside of the tube by means of a magnetic coupling. By using a spring wound clock to drive the chart this meter is claimed to be completely explosion-proof. Booth Nos. 304-306.

Fisher Scientific Co.: Improved apparatus and instruments will be shown, among which will be the newly devel-

oped Fisher Sub-Sieve Sizer, an entirely new apparatus for determining the average particle size of powders. This instrument, just recently announced, is said by the company to be in demand among such manufacturers as those making cement, pigments, carbon black and others where very fine particles are to be produced.

Other instruments on display will be the Fisher Titrimeter, Fisher Electrophotometer, Fisher Mortar Grinder, etc. Booth No. 112.

General Ceramics Co.: This exhibit will comprise chemical stoneware equipment and also a new line of industrial chemical porcelain. The stoneware equipment will include an assembly for the cooling and refrigeration of chlorine and a tower for drying the gas by sulfuric acid. Other acid proof stoneware items include a duplex condensing coil, an armored centrifugal pump, a kettle complete with agitator and accessories suitable for nitration, sulphonation, etc., a vacuum filter and miscellaneous chemical plant equipment. Booth No. 3.

Hanovia Chemical and Manufacturing Co. will feature ultra-violet light equipment for industrial and laboratory applications. Powerful arc tubes as long as four feet and using five kilowatts of power will be included. They are used for such processes as vitamin D formation in milk, photoprinting, and as catalyst for various photo-chemical processes. In addition various black light lamps and a line of fused quartz will be shown. Booth No. 118-124.

Henry E. Jacoby is featuring an expanded line of full-view fittings suitable for pipe runs both vertical and horizontal. In addition to the original full-view flow glass this firm will also show its new rotary flow glass, as well as drip tubes and sight tubes which it is now introducing. Booth 412.

Kewaunee Mfg. Co.: This company will have an exhibit built around a new product, Kemrock, which is a deep black material resistant to acids, bases and solvents. Kemrock is a porous stone, impregnated with a synthetic resin, which gives it unusual resistance qualities. It is used for laboratory table tops, fume hoods, sinks, tanks, troughs and reagent racks. Booth Nos. 726-728.

The Kron Co. will show the following new equipment features. (1) The Magna-pointer which is an electro magnetic pointer for industrial dial scales and precision force instruments. (2) The Walton attachment which may be fitted to dial scale to provide an auxiliary which is said to be four to five times more sensitive than the regular weighing platform. (3) A batching scale with revolving dial chart to assist in accurately and quickly compiling chemical mixtures by formula. As each ingredient is added the chart is revolved so that the zero is coincident with the new pointer by direct reading without any calculation. Booth Nos. 426-428.

The La Bour Co., Inc., will show its complete line of centrifugal pumps including a new type of self-priming centrifugal pump of higher efficiency than the previous unit. This new line will be known as the DPLT in place of the former DPL self-priming line. A new type of gravity feed, especially for small capacity, high head service which will be known as the DZT type to replace the former DZ line will also be exhibited. A variation of type "Q" gravity feed non air binding centrifugal pumps, having porcelain body with metal impelers will be introduced. As an adjunct to these pumps porcelain pipe, fittings, check and throttle valves, and strainers will be on hand. Booth No. 520.

Lancaster Iron Works, Inc. This exhibit will be built around two full size laboratory model mixers, together with a scale model of a larger production machine for application to dry, damp, stiff-kneadable, soft-kneadable or slurry consistencies. These mixers embody the counter-current principle of mixing. The scale model includes dust control features, full batch elevator type loading hopper and central discharge valve. Booth No. 738.

Lapp Insulator Co., Inc., will display a porcelain pipe line under pressure, having porcelain joints without any gaskets.

Among the other items to be shown are a series of new valve developments including quick-opening assemblies giving split second operation; and also porcelain pop-type safety valves which are new in all porcelain construction.

There will also be an all porcelain process tower showing the manner of construction and arrangement of tower packing and support plates. The company will show for the first time a tower packing support plate in a new design that provides about 65 to 70 per cent openings, which is roughly double that previously obtainable in ceramic plates. Booth No. 318.

Leeds & Northrup: As examples of progress in measurement and control, two operating control equipments applied to specific chemical processes will be exhibited.

Micromax Automatic pH Control is easily tuned to a number of varied processes to measure, record and control acidity or alkalinity. The primary element for this equipment is claimed to be a robust glass-electrode assembly which requires practically no maintenance.

Micromax SO_2 Control regulates the secondary air valve of a sulphur burner accurately and continuously so that the per cent SO_2 is held practically constant at the desired maximum. Booth No. 406.

Merco Nordstrom Valve Co. will show a complete line of lubricated plug valves with emphasis on special alloy valves. Sectional cut-away models will be displayed to demonstrate the patented "Sealdport" method of valve lubrication.

Featured will be valves with "Merchrome" coating. This is a patented process of hard facing whereby the contact surfaces of plug and body are armored against extreme conditions of corrosion and erosion. Also to be shown are valves with extended shanks for use on very high or low temperature services. Booth Nos. 323-325.

Milton Roy Pumps. A new pump with electronic volume control by means of which chemical volumes may be regulated by a single dial control, either at the pump or pumps, or from a remote station will be shown. This control is manually operated in its usual form. It may be automatically operated by a flow-meter, temperature or pressure control or other instruments through suitable electrical circuits. Another new high pressure, controlled metering, triplex pump will also be on display. This pump minimizes pulsations, and handles a greater volume per hp. at a given pressure. Booth Nos. 627-629.

The Mine Safety Appliances Co. will exhibit a number of new and improved items in its line of safety equipment:

A new carbon monoxide alarm is now completely enclosed in a weather-proof case. Used for the continuous sampling of air, it will give an audible and visible warning when the CO concentration reaches a predetermined limit.

Among other features will be air filters, face shields, headgear and goggles. Booth No. 312.

Mixing Equipment Co., Inc.: This exhibit will include industrial type mixers and agitators for fluids, particularly featuring a new line of air driven mixers and gas dispersers claimed to have

exceptionally high efficiency. Booth No. 613.

The Niagara Blower Company, will exhibit air engineering equipment, including unit air conditioning apparatus, "No Frost" cooling equipment and the Aero Heat Exchanger, illustrating new developments in the control of conditions surrounding chemical processes by air conditioning and control of temperature, by the air method, in chemical process materials. Booth Nos. 212-214.

Pangborn Corporation's exhibit will feature industrial dust control and blast cleaning equipment. Among recent developments are: (1) An industrial type unit collector, available in three sizes, entirely self-contained, for the control and collection of dusts produced in process plant equipment, and grinding wheels; blast cleaning equipment, and all dry dust problems to a maximum of 3,000 C.F.M. (2) A new dust wetter which has been applied for mixing dry collected dusts with water, or other liquids, to form a heavy mud or sludge for transport and disposal. Booth No. 624.

The Pfaudler Co. Reflecting several wartime developments this company will exhibit new types of glass-lined and stainless steel chemical processing equipment.

Of interest to petroleum and chemical engineers, will be a section of a standard 48" I. D. glass-lined steel isomerization tower, built for 300-lbs. internal pressure. Only a section of the tower can be shown, since the height is 35'. It will be so arranged that visitors may examine the type of forged flanges and plate supports that are used.

Also to be shown for the first time is a new Pfaudler rotary glass-lined dryer. The unit is a laboratory model, measuring 10' overall. It can be used for drying various salts and food products as well as the continuous crystallization of certain salts.

Another new unit will be an example of a recently announced line of standard stainless steel reaction kettles which are offered in capacities ranging from 5 to 600 gallons. The unit to be displayed will be a 200-gallon model, equipped with stainless steel agitator and baffle, powered by a motor drive.

Other new items include glass-lined steel flush valves and safety valves, a new glass-lined sight box, high pressure glass-lined pipe, glass-lined steel heat exchangers, etc.

Completing the display will be a 500-gallon high pressure glass-lined reactor, equipped with glass-lined impeller agitator and adjustable baffle. Booth No. 502.

Photovolt Corporation will exhibit a few new models of photoelectric colorimeters. These new models are designed for greatest convenience and simplicity in operation in routine colorimetric tests. One of the models is operated by a dry-cell battery contained in the instrument housing so that the colorimeter does not require any external power connection and can be used in the plant and in the field.

Among the other new items shown for the first time is a photoelectric vitamin A meter for determining the vitamin A potency of fish oils, a photoelectric smoke meter for indicating smoke density in the exhaust gas of internal combustion engines and furnaces, and a photoelectric reflection meter for measuring color and reflectance of opaque surfaces such as paper, paints, textiles, etc. A photoelectric Glossmeter is designed for registering the shininess of paints, metallic surfaces, and plastics and for determining their mar resistance. Booth No. 702.

Reeves Pulley Company will feature their new Variable Speed Transmission with built-in reducer.

The Reducer-Type Transmission is said to meet the requirements for accurate variable speed control and speed reduction, combined in one unit. An outstanding advantage claimed for this drive is that far less mounting space is needed to obtain the lower output speeds which formerly required the use of auxiliary speed reducing equipment. Booth No. 205.

Claude B. Schneible Co. will have an illuminated multiwash dust collector unit built of glass in operation to show its equipment is used to dispose of dust, smoke and other impurities or foreign matter in the air. Booth Nos. 623-625.

The Selas Company will display an entirely new type of compressed air filter, the operation of which involves the utilization of basic principles from the fields of both capillary physics and surface chemistry. This filter will remove all dirt and moisture in the form of water and oil droplets from the air and continuously and automatically eject the moisture from the line without the use of any moving parts whatsoever. The entire operation will be contained in a single compact unit with pipe connections for straight line installations.

There will also be on display an entirely new method of continuously separating any two immiscible liquids. In actual operation will be a small unit which will continuously separate a mixture of gasoline and water. The gasoline-water mixture is pumped to a chamber in which is contained two micro-porous cylinders. The one is rendered impervious to the gasoline but will allow the water to pass through; the other is rendered pervious to the gasoline but will not allow the water to pass through. Booth No. 619.

F. J. Stokes Machine Co. This exhibit will feature: (1) A new line of Higher Vacuum Pumps with high volumetric efficiency which produce, commercially, vacuum in the very low micron range. (2) A new portable vacuum gauge of the McLeod type, giving accurate, rapid readings within the micron range. These gauges require no calibration against other Gauges. Equipped with special trap, readings with this gauge are accurate in the presence of all gases including hydrogen and condensible vapors including water. (3) A new high capacity power metallurgy press together with various pieces made by this method. (4) Dehydrated, biological products desiccated from the frozen state under High-Vacuum—such products as blood plasma, penicillin, serums, etc. Booth No. 224.

The Titanium Alloy Manufacturing Co. will display titanium and zirconium compounds along with alloys which include ferro titanium, silicon titanium, nickel titanium and manganese titanium. The display will also include products which use these materials in their manufacture. Among these will be pottery, high temperature refractories, electrical insulation applications, etc. Booth No. 408.

The U. S. Stoneware Co. will display the following items: (1) "Ceratherm 500," low pocosity chemical stoneware said to be capable of withstanding violent heat shocks. (2) A new cast lead valve with a reversible and replaceable valve seat. (3) Tylox—a new boltless, flexible coupling for chemical stoneware or asbestos-cement pipe. (4) Reanite—the bonding process which unites metal to metal, or rubber, synthetic rubber, plastics, leather, wood or glass to metal or to each other with a bond in many instances stronger than the material itself. (5) New formulations of Tygon, flexible, rubber-like corrosion-resistant plastic material. Booth Nos. 103 & 201.

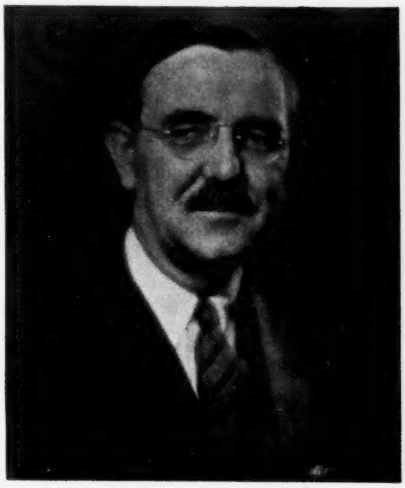
Wallace & Tiernan, Inc.: In addition to several demonstrations of chlorination efficiency, this exhibit will include a demonstration model of a typical control unit and an operating model of a reagent solution feeder. Booth No. 606.

Headliners in the News

DR. CARL SHIPP MARVEL, professor of organic chemistry in the University of Illinois, has been awarded the 1944 William H. Nichols Medal of the New York Section of the American Chemical Society. Dr. Marvel was cited for outstanding organic chemical contributions to the structure of vinyl polymers.

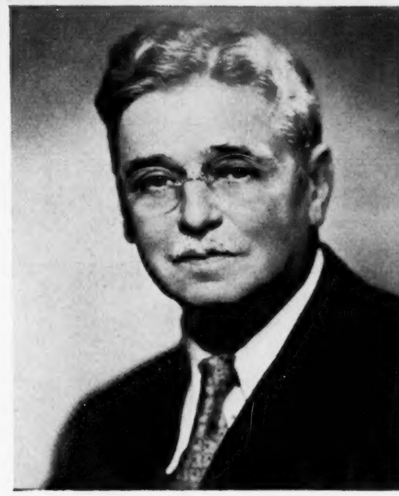
DR FRANK C. CROXTON has been named supervisor of organic chemistry at Battelle Memorial Institute. Prior to joining the Institute staff in 1939 Dr. Croxton was associated for nine years with the research laboratories of the Standard Oil Company of Indiana where he was engaged in lubricating oil and catalytic cracking research.

FRANCIS J. CURTIS has been elected a vice-president at Monsanto Chemical Company, according to announcement by Charles Belknap, president. In his new capacity, Mr. Curtis will be in charge of Monsanto's long range program of development here and abroad, including general research and general sales development.

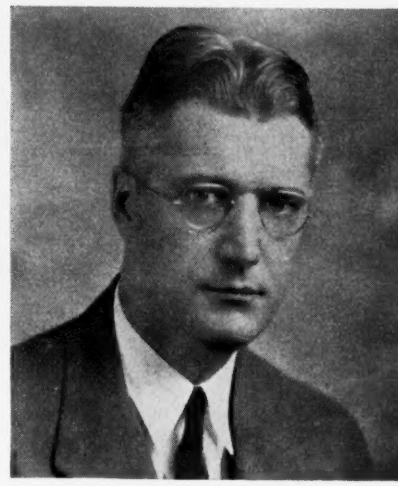


DR. AUSTIN G. EDISON, identified with the design and operation of the Du Pont nylon plants from the beginning of the development, has been appointed technical manager in the nylon research section. He succeeds Dr. Louis L. Larson, who has been transferred to a special assignment in the Explosives Department of the company.

DR. PAUL D. V. MANNING, Director of Research of International Minerals & Chemical Corporation of Chicago since August 1, 1941, was recently elected a vice-president. As Director of Research, Dr. Manning is in charge of International's long-range development program and is responsible for the technical work.



GASTON DUBOIS, vice-president of Monsanto Chemical Co., has been chosen by the American Section of the Society of Chemical Industry to receive its Perkin Medal in recognition of outstanding achievement in applied chemistry. The medal will be presented at a meeting of the Society in New York, Jan. 7.



DR. LESTER S. SINNESS, for eight years engaged in research activities in the Technical Division of the Du Pont Rayon Department, has been named Director of Viscose Rayon Research, the company announced today. Dr. Edward F. Wesp, who has been rayon research manager at Buffalo, becomes assistant director, succeeding Dr. Sinness.

JAMES R. BISHOP has been elected vice-president in charge of the Amino Products Division of International Minerals & Chemical Corporation. Mr. Bishop was formerly assistant to the president and later vice-president of the American Maize Products Company, with whom he held executive responsibilities for over ten years.

Society of Chemical Industry Holds Inaugural Dinner

Wallace P. Cohoe, prominent consulting chemist of New York, was inducted as president of the Society of Chemical Industry at a dinner meeting held at the Waldorf-Astoria in New York on October 22. About 800 chemists and industrialists attended. The event was a continuation of the proceedings of the annual meeting of the Society held in London, July 9th, at which Mr. Cohoe was elected president to succeed Dr. William Cullen of London, and which was convened to reconvene in New York. A cable message of felicitation from the Council of the Society assembled in London and signed by Dr. Cullen was read at the dinner, at which Mr. Cohoe delivered the inaugural address.

Sir Gerald Campbell, K.C.M.G., British Minister at Washington represented the British Government, presented the chains of office to Mr. Cohoe and delivered an inspiring address. Dr. Cohoe is on the left and Sir Gerald on the right.

Above, left to right: James L. Bennett, of Hercules Powder Co., and president of the American Institute of Chemical Engineers, who read citation of the achievements of Alexei Bach, Russian biochemist who was awarded honorary membership in the Society. Dr. Te-Pang Hou, famous Chinese industrial chemist, who was awarded honorary membership in the society for his outstanding work in developing a chemical industry in China; Dr. Foster D. Snell, head of the American section of the Society, who presided at the meeting; and Dr. Wei Tao-Ming, the Chinese Ambassador to the United States, who presented a scroll citing the achievements of Dr. Hou to the chemical industry.

Below, left to right: Tsune-Chi Yu, Chinese Consulate General; Victor S. Bartram, past president of the Society and president of Shawinigan Chemicals; David M. Goodrich, Chairman of the Board of the B. F. Goodrich Co.; and Walter S. Carpenter, president of E. I. du Pont de Nemours.

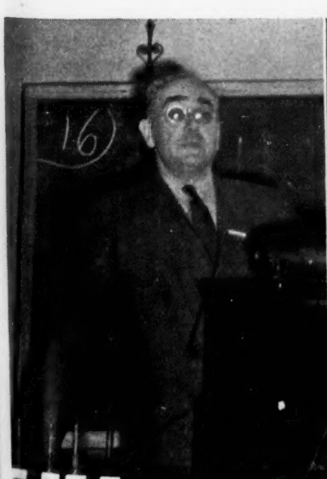
Above: Dr. Lincoln T. Work, Director of Research of the Metal & Thermit Corporation and General Chairman of the meeting addresses the group. Seated to the left of Dr. Work is Dr. Walter S. Landis of the American Cyanamid Company and to the right, Dr. R. M. Burns of the Bell Telephone Laboratories, who is president of the society.

Electrochemical Society Meets in New York

Members and guests of the Electrochemical Society met in New York, October 13-16 to review and discuss the many important developments in electrochemistry and especially the phases associated with the war effort. During the four-day meeting about twenty-six scientific and technical papers were given covering a broad range from metal plating to organic reactions carried out in electrical discharges. A display of manufacturers' exhibits claimed the interest of many members and guests and gave them an opportunity to discuss common equipment and process problems. Some of the active participants at the meeting are shown on this page. For a more detailed review of the meeting see page 671.

Above, left to right: Dr. Colin G. Fink of Columbia University, Secretary of the Society; H. Germain Creighton of Swarthmore college, who presided at the Thursday afternoon Scientific-Technical Session; Dr. B. D. Saklatwalla, who delivered the Richards Memorial Lecture on "Thermal Reactions in Ferro-Alloy Metallurgy, the Basis of Alloy Steel Development"; T. C. Manley of Ozone Processes, Inc., who presented a paper entitled, "Electrical Characteristics of the Ozonator Discharge."

Below, left to right: George Glockler of the University of Iowa presented a paper "Acetylene Polymer Produced in Electrical Discharge"; Joseph Rossman spoke on "Electro-Chemistry in the Patent Office"; Sherlock Swann of the University of Illinois discussed "The Electrolytic Reduction of Amides"; and Ralph Pearson of Northwestern University gave a paper on "The Electrolysis of the Nitroparaffins" before various groups at the scientific and technical sections.



Society of Plastics Industry

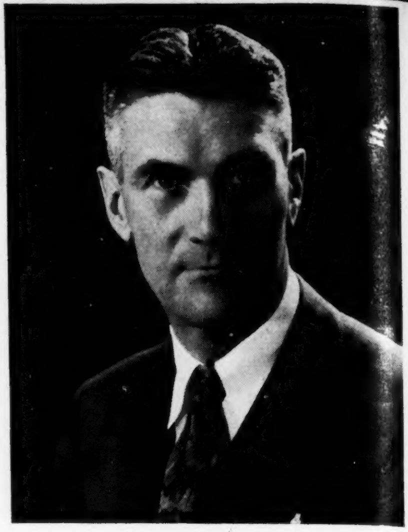
Holds Annual Fall Meeting

The Society of the Plastics Industry held its annual fall meeting in New York City on November 8th and 9th. The program of the meeting was directed primarily toward war problems and industrial aspects of the plastics industry and the interchange of information on new materials and processes of manufacture. However it was plainly evident that postwar problems were of vital concern to many of those who attended.

Among the featured speakers were: Commissioner William B. Herlands, who described the work of the Department of Investigation of the City of New York; Quentin Reynolds, war correspondent, who told of his experiences in Russia and with the American Troops in North Africa, Sicily, and Italy; and the Honorable Albert B. Chandler, senator from Kentucky.

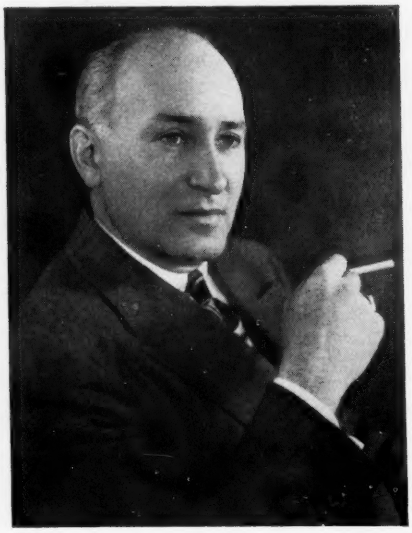
Throughout the meeting an exhibit of the wartime applications of plastics attracted considerable interest. Because of the fact that about eighty-five percent of the industry's production is devoted to the war effort, this exhibit actually comprised an extensive demonstration of the use of plastics as engineering materials.

At the right, George K. Scribner of the Boonton Molding Company, president of the Society.



Dr. Ralph H. Ball, Assistant Technical Director of the Plastics Division, Celanese Corporation of America, delivered a paper on "The Cellulosic Family of Plastics." In his talk Dr. Ball discussed the properties of the cellulosic types of plastics in relation to each other and to other types of plastics.

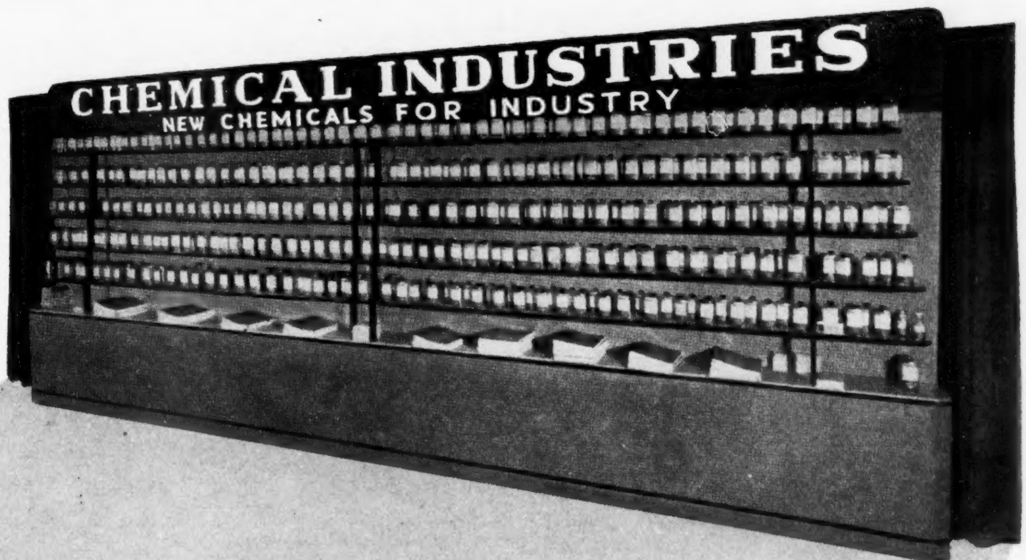
Charles C. Livingston, Vice-President and General Manager of the Cruver Manufacturing Company, addressed the Thursday morning meeting, limited to Society of Plastics Industry members, on the subject of postwar planning. This subject, along with termination of war contracts caused considerable discussion.



Alden B. Dow, architect, is shown arranging his exhibit of the all-plastic home, which is constructed primarily of plastics with translucent walls and roof. Mr. Dow, an exponent of modern design in housing, delivered a paper on "Plastics in the Home of the Future."

Below, left to right: Dr. A. J. Stamm, Forest Products Laboratory, U. S. Department of Agriculture, spoke on "Wood and Paper Base Plastics"; A. E. Byrne of the Canadian General Electric Co. and Chairman of the Canadian Section of the S.P.I. presided at the Tuesday luncheon meeting; N. J. Rakas, Alternate Chairman, Plastics Rubber Laboratory, Chrysler Corporation, gave a report on the work of the S.P.I. Technical Committee; and Dr. W. Gallay of the National Research Council of Canada who discussed "A Novel Hot Gluing Technique."



Once again we take pleasure in presenting "New Chemicals for Industry", a catalogue of new products developed by advertisers in CHEMICAL INDUSTRIES during the past two years.

A feature for many years of the Exposition of Chemical Industries in New York and recently the National Chemical Exposition in Chicago, this collection has become a recognized and valued institution in the industry. It is here that many of our now important tonnage chemicals made their debut. Few could forsee the dramatic future for such laboratory infants as butadiene, pentaerythritol, sulfamic acid, the nitroparaffins, and many others when they first made their commercial appearance in "New Chemicals for Industry". Who knows which of this year's newcomers will follow in their footsteps?

The 1943 "New Chemicals for Industry", described on the following pages will be displayed at the Exposition of Chemical Industries, Madison Square Garden, New York, December 6-11. The descriptions will also be printed in a special supplement to be distributed by CHEMICAL INDUSTRIES at the Exposition.

We invite you to visit us at Booth 509-11, look over the display of new chemicals, pick up a copy of the supplement, or just get acquainted. A cordial welcome awaits you.

New Chemicals for Industry

A catalogue of New Chemical Products introduced during 1942, 1943 by the advertisers in Chemical Industries Magazine and displayed at the 19th Exposition of Chemical Industries, Madison Square Garden, New York, N. Y., December 6 to 11, 1943

ACCELERATOR S-288

Sp. gr., 1.13. Suggested Use: An alkaline plywood glue accelerator developed for use with plywood glule S-273 in the proportions of 100 parts glue to 6.5 parts accelerator. Stroock & Wittenberg.

ACETAMIDINE HYDROCHLORIDE (Ethanamidine)

$CH_3C(=NH)NH_2HCL$. Mol. wt., 94.55. Melting point, 164-6°C. White crystals. Soluble in water and alcohol; insoluble in ether. Odor, slight ethereal. Slightly deliquescent. Stable. Chemical properties: Basic in reaction. Forms pyrimidine rings with various esters and addition compounds with certain metallic salts. Suggested Uses: Manufacture of pyrimidines and Vitamin B_1. Available in small lots for experimental purposes. The Niacet Chemicals Corp.

ACETOPHENONE

Mol. wt., 120.14. Sp. Gr., 1.026 @ 20°/4°C. Refractive index, 1.531 @ 25°C. Boiling point, 202-203°C @ 760 mm. Viscosity, 0.162 g./cm. sec. @ 25°C. Solubility, slightly soluble in water, miscible with alcohols, ethers, hydrocarbons, oils, and most solvents. Odor, strong but pleasant; mild hypnotic action. Color, water white. Chemical Properties: It undergoes all the usual ketone reactions but does not form a bisulfite addition compound. The methyl group readily enters into condensation reactions. It can be nitrated and readily chlorinated to chloroacetophenone. It is readily hydrogenated to methyl-phenyl-carbinol. Suggested Uses: As a high boiling solvent for cellulose esters and ethers, coumar and glyptol resins, shellac, and most vinyl resins. In perfumery. As a plasticizer, it imparts elasticity and flexibility to films, but the action is not permanent. As an intermediate. For pharmaceuticals, etc. Availability: It is available in small quantities for experimental investigations. Monsanto Chemical Co.

ACETYL IODIDE

CH_3COI. Mol. wt., 169.93. Boiling point, 108° (760 mm.), 358° (50 mm.). Density @ 17°C, 1.98. Colorless liquid, darkens on exposure to light. Odor, irritating, pungent. Chemical Properties: Hydrolyzes rapidly in the presence of moisture. Suggested Uses: Acetylation reagent. Available in experimental quantities. Shipping regulations: Glass stoppered bottles, red labels. The Edwal Labs, Inc.

ACETYL METHYL CARBINOL (Acetoin)

$CH_3COCHOHCH_3$. Slightly yellow liquid with tendency to slowly change into crystalline polymer which can be converted back into the monomer by careful melting of crystals. Sp. gr., 1.016 @ 15°C. Boiling point, 140°C-144°C. Miscible with water in all proportions. In contact with air slowly oxidizes to diacetyl. Suggested Uses: In place of diacetyl in cases where diacetyl itself is too volatile. Fairmount Chemical Co., Inc.

ACID PICKLING INHIBITOR, PM-40

Acid soluble, highly stable pickling agent retaining activity over relatively long time intervals. Suggested Uses: Sulfuric acid and muriatic acid pickling baths. Effective in low concentrations. Shipped in fiber cartons, 25 lbs. and 75 lbs., and in wooden barrels, 300 lbs. Pennsylvania Salt Mfg. Co.

ACIDS, LOW MOLECULAR WEIGHT (Pelargonic Acid)

Consists chiefly of pelargonic acid, $CH_3(CH_2)_7COOH$, with minor amounts of other low molecular weight aliphatic acids. Combining wt., 145-150. Sp. gr., 0.926 @ 15.5°/15.5°C. Dist. range, 90% between 230-270°C @ 760 mm. Solubility, very slightly soluble in water, soluble in alcohol and ether. Color, light yellow. Odor, strong characteristic. Chemical Properties: Has the usual properties of organic acids forming salts, ester, acid halides, amides, etc. Its sodium and potassium salts are very water soluble but show little detergency; calcium and aluminum salts insoluble in water. Suggested Uses: In the manufacture of plasticizers, pharmaceuticals, synthetic flavors and odors and other organic chemicals. Available in limited commercial quantities. Cont., 55 gal. returnable drums. Emery Industries, Inc.

ACITERGE-OL

A salt of a substitued oxazoline. Sp. gr., 20°/20°C, 0.977. Flash point, degrees °F (Cleveland Open Cup), 115. Solidification point, °C, initial is —15, final is —21. Solubility in mineral oil, less than 0.1%; alcohol, completely miscible; water, completely miscible. Suggested Uses: Aciterge-OL may serve as a penetrant or detergent, as an emulsifying assistant, and as a wetting or foaming agent. It is a surface active agent of the cationic type. In water solutions containing from 0.05 to 0.5% Aciterge-OL, water-oil interfacial tensions less than one dyne per centimeter are obtained. Commercial Solvents Corp.

ADHESIVE 90-43D

Resin modified vinyl base emulsion containing 42% solids. Suggested Uses: As a wet-combining adhesive and may be applied by the conventional knife-coat method for laminations. American Resinous Chemicals Corp.

ADHESIVE F7-48

Resin modified vinyl emulsion yielding a colorless clear pressure sensitive film. Suggested Uses: Developed for the manufacture of surgical cohesive bandage. Also used as a general adhesive compounding base. American Resinous Chemicals Corp.

ADHESIVE H4-18

High solids vinyl emulsion. 60% solids. Excellent strength in its own right. Good combining adhesive. Suggested Uses: For impregnating paper, felts, etc. American Resinous Chemicals Corp.

ADHESIVE H8-22

Adhesive base. Suggested Uses: In conjunction with neoprene latices and reclaim dispersions for formulating pressure sensitive adhesives for shoe adhesives, tapes, folding cements, leather, etc. American Resinous Chemicals Corp.

ADHESIVE H8-23

Tackifying emulsion for butyl rubber dispersions. Suggested Uses: Adhesives containing H8-23 and butyl rubber possess strength and pressure sensitivity and are adaptable for general dry combining applications. American Resinous Chemicals Corp.

AEROLUBE

Chemical Properties: Combined antioxidant and detergent for use in automotive lubricating oils. Suggested Uses: Adaptable for use in a variety of lubricating oil stocks for various types of engine service ranging from medium duty automotive service to heavy duty diesel and gasoline engine service. Suitable combinations of Aerolube with lubricating oil stocks are developed in cooperation with lubricant manufacturers. American Cyanamid & Chemical Corp.

AEROSOL NO. 18

N-octadecyl di sodium sulfo succinamate.

NaO_3S-CH-$COONC_{18}H_{37}$
CH_2-COONa

Mol. wt., 461. White paste containing 35% active ingredient, 65% water. Not soluble in polar or non-polar solvents. Good ability to foam. Will solubilize soaps and wetting agents but not organic water insoluble solvents. Stable at room temperature in up to 5% sulfuric or hydrochloric acid but is precipitated if heated above 80°C for a period of time. Stable to alkalies up to 5% concentration, being salted out from concentrations of sodium hydroxide above 5%. Suggested Uses: Where emulsifying, foaming and detergency is required in contrast to the primary wetting action of the regular Aerosol wetting agents. American Cyanamid & Chemical Corp.

AEROSOL NO. 22

N-octadecyl N(1,2 di carboxyethyl sulfo succinamate).

CH_2-COONa
CH-COONa
NaO_3S-CH-CON
$C_{18}H_{37}$
CH_2-COONa

Mol. wt., 641. Light yellow, granular solid in pure form. Soluble: In up to 30% sodium hydroxide or 20% nitric acid solutions at room temperature; soluble in saturated solutions of electrolytes; insoluble in polar or non-polar solvents. Good foaming ability. Will solubilize water-insoluble organic liquids in addition to soaps and wetting agents. Suggested Uses: Where emulsifying, foaming and detergency is required in contrast to the primary wetting action of the regular Aerosol wetting agents. American Cyanamid & Chemical Corp.

ALKATERGE-O

A substituted oxazoline. Mol. combining wt., approx. 350. Sp. gr., 20°/20°C, 0.93. Flash point, °F (Cleveland Open Cup), 380. Distil. range, °C, 3 mm. pressure, 174-305. Solidification point, °C, approx. —26. Solubility in water, approx. 0.1%; mineral oil, completely miscible; alcohol, completely miscible. An oil-soluble, dark brown, viscous liquid, Alkaterge-O is a high molecular weight, amine-type compound. It is non-volatile and practically insoluble in water. Suggested Uses: As an extender for the usual emulsifying agents; has valuable dispersing and spreading properties. It has possibilities as a corrosion inhibitor and as a penetrant for lubricants and oils used in the leather and textile industries. Commercial Solvents Corp.

ALKYD 18

Derived from a modified alkyd resin base containing 40% solids. Suggested Uses: Extender for natural and synthetic latices. Recommended ratio range of latex modification is 20-75%. When compounded with latex (natural or synthetic), the resulting mixture is satisfactory for many applications which normally employ straight latex. May be used with Neoprene and is available in varying degrees of flexibility. American Resinous Chemicals Corp.

ALKYD G2-28A

Alkyd-synthetic rubber combination (40% solids). Is comparable to 40% natural latex. Suggested Uses: As an adhesive base and impregnant; as a starting base for adhesive compounding. American Resinous Chemicals Corp.

ALLYL MERCAPTAN

$CH_2=CH\text{-}CH_2\text{-}SH$. Mol. wt., 74.1. Boiling point, 65-67°. Water white liquid which darkens on standing. Odor, strong, garlic-like. Chemical Properties: Usual reactions of active mercaptan group. Suggested Uses: Has been proposed for use in synthetic flavoring. Available on order. Shipping Regulations: Red label. The Edwal Labs., Inc.

ALUMINUM CHLORIDE, Anhydrous

$AlCl_3$. A technical grade of aluminum chloride in the form of buff-colored granular powder and aggregates. Small amounts of ferrous chloride constitute the major impurity. Suggested Uses: Catalyst for Friedel-Craft type reactions and for use in applications requiring anhydrous aluminum chloride. Availability: Pilot plant quantities. Monsanto Chemical Co.

ALUMINUM FLUORIDE

AlF_3. Mol. wt., 83.97. Fine white powder. Bulk density, 50 lbs./ft.^{3}. Very slightly soluble in water, acids, and alkalis. Suggested Use: Flux in aluminum manufacture. Packed in paper bags or barrels. Pennsylvania Salt Mfg. Co.

ALUMINUM METAPHOSPHATE

$Al(PO_3)_3$. Mol. wt., 263.91. Appearance, white crystalline powder. Melting point, above 1700°C. Solubility, insoluble in water, practically insoluble in acids. Suggested Uses: Constituent of glasses, chinaware and porcelains. Available in limited quantities. Monsanto Chemical Co.

AMERSOL 63-25

Resin solution containing 69% solids derived from acrylic-type resins copolymerized with additional resinous bodies to impart permanent tack to the system. High solids content. Suggested Uses: In making adhesive tapes as complete replacement for rubber cement. American Resinous Chemicals Corp.

AMERSOL D1-18A

Synthetic rubber adhesive solution. Suggested Uses: Preparation of removable masking tapes designed to be stripped without leaving undesirable adhesive residue. American Resinous Chemicals Corp.

AMERSOL G5-7C

Resin solution of high solids (75%) and high viscosity which dries rather quickly. Suggested Uses: Substitute for rubber cement but should be bonded before it is completely dry. For sock lining cements. Dilute with benzol, toluol or carbon tetrachloride. American Resinous Chemicals Corp.

AMERSOL H2-14B

Neoprene cement. Suggested Uses: In the shoe industry for folding and pressure-sensitive adhesion in general. Suitable for adhesion of rubber to rubber, neoprene to neoprene, or rubber and neoprene to metals. Available in both vulcanizable and non-vulcanizable types. American Resinous Chemicals Corp.

AMERSOL H3-37

Buna S adhesive solution. Suggested Uses: For adhesive tapes. Air and heat vulcanizable modifications also available. American Resinous Chemicals Corp.

AMERSOL H3-46

Black air-drying enamel. When applied to a metallic surface, it dries to a hard finish overnight. Suggested Uses: Protective coating against corrosion. Available in baking modifications for more stringent requirements. American Resinous Chemicals Corp.

o-AMINODICYCLOHEXYL

$C_{12}H_{23}N$. Sp. gr., 0.94 @ 25/25°C. Mol. wt., 109. Refractive index, 1.5 @ 25°C. Boiling point, 270°C. atmospheric pressure. Appearance, colorless liquid. Suggested Uses: As an intermediate or in reactions where an essentially water soluble strong primary amine may be required. Status: Laboratory product, not demonstrated on plant scale. Monsanto Chemical Co.

2-AMINO-5-HYDROXY DIPHENYL

$C_{12}H_8NH_2OH$. Mol. wt., 185. Melting point, 116-117°C. Soluble in alcohol. Soluble in hot benzene—almost insoluble cold. Extremely poor solubility in water. Chemical Properties: Typical of a simple amino phenol. Undergoes reaction on both of the amino and hydroxy groups. Suggested Uses: Antioxidant, photographic developer and dyestuff intermediate. Available in sample quantities. Monsanto Chemical Co.

2-AMINOTHIAZOLE

$C_3H_4N_2S$. Mol. wt., 100.14. Crystallizing point, 87.5°C. Assay, 98%. Appearance, light brown crystals. Suggested Uses: In chemical syntheses. Status: In current production. Laboratory samples available. Monsanto Chemical Co.

AMMONIUM ETHYL PHOSPHATE

75% solution in water. Color, water white to yellow tinge. Odor, ammoniacal. Sp. gr., 1.23 @ 25°C. Wt. per gal., 10.37 lbs. pH 75% sol., 7.0 — 7.2. Viscosity, 60 centipoises. Hygroscopic, in thin film is liquid at relative humidities above 40%. Suggested Uses: Flameproofing for paper, textiles, etc.; humectants; wool lubricants. Availability: For government contracts or upon allocation. Monsanto Chemical Co.

AMMONIUM THIOSULPHATE

$(NH_4)_2S_2O_3$. Mol. wt., 148.21. Colorless crystals, very soluble in water, insoluble in alcohol, ether. Suggested Uses: Photographic fixing agent, cleaning metals to be plated. Available from stock. Shipping Regulations: Chemicals, NOIBN. The Edwal Labs, Inc.

APP-L-SET

White powdered material containing a growth control agent, readily dispersible in water. Suggested Use: To prevent preharvest drop of apples and pears resulting in a reduction of spot picking and producing fruit of better color. The Dow Chemical Co.

ARASAN

Active ingredient (50%) is Tetramethyl Thiuramdisulfide. Suggested Use: Organic seed disinfectant and protectant for peanut and many vegetable seeds. Bayer-Semesan Co., Inc. (E. I. du Pont de Nemours & Co., Inc.)

ARFLEX A6-27

Acrylic emulsion. Suggested Uses: Leather finishes. Its binding properties for pigments makes it useful for garnet leathers. Also useful as a sealer coat for lacquer water finished splits and side leather. American Resinous Chemicals Corp.

ARIDEX DCX

Aluminum salts wax dispersion. Suggested Use: Solvent type water repellent finish applied either in a standing bath or in a washer from dry cleaning solvents by dry cleaners who retreat garments. E. I. du Pont de Nemours & Co., Inc.

ARIDEX LX

Aluminum salts wax dispersion. Suggested Use: Emulsion type water repellent finish applied from a water solution by textile mills. E. I. du Pont de Nemours & Company, Inc.

ARLAC 59-43A

Solid shellac substitute available in lump or powdered form. May be prepared in alcohol or water solutions. Suggested Uses: Shellac replacement for many industrial coatings such as aeroplane parts, furniture, greaseproofing, marine primers, paper food wrappers. Has heat sealing properties and deposits a tough, flexible film. American Resinous Chemicals Corp.

AROCHEM 524

Glycerine free, modified maleic resin with high melting point. Good tolerance for ethyl alcohol and lacquer plasticizing oils. Acid number, 20-30. Melting point, 118-125°C. Sp. gr., 1.10. Suggested Uses: In lacquers; also in air drying and baking "solft oil" varnishes. Stroock & Wittenberg.

AROCHEM 595

High melting point modified maleic resin. Acid number, 30-40. Melting point, 145-155°C. Sp. gr., 1.10. Suggested Uses: Manufacture of high viscosity "soft oil" varnishes and also fast setting printing ink vehicles with good hold out. In varnishes and cold cuts, it has fast solvent release. Stroock & Wittenberg.

AROCHEM 600

Glycerine free hard resin similar to Arochem 605 but lower in melting point. Melting point, 130-140°C. Acid value, 25-30. Sp. gr., 1.10. Suitable for same puposes, but not as rapid in bodying and drying characteristics; also imparts less hardening effect to "soft oil" varnish films. Stroock & Wittenberg.

AROCHEM 605

New variety of glycerine free, modified hard resin. Melting point, 155-165°C. Acid value, 25-35. Sp. gr., 1.12. Suggested Uses: In fast bodying, fast drying "soft oil" varnishes; spar or general purpose. Imparts hardness and toughness to "soft oil" varnishes. Stroock & Wittenberg.

AROFENE 775

Pure phenol-formaldehyde condensate. Non-reactive, oil soluble. Melting point, 121-138°C. Sp. gr., 1.05. Suggested Uses: To be combined with oils in manufacture of spar varnishes, reinforcing varnishes and varnishes with high chemical resistance. Stroock & Wittenberg.

AROPLAZ 1326

Short oil, hard resin modified, oxidizing alkyd resin. (50% solids in xylol). Fast solvent release and drying characteristics. Dries to very hard and resistant film. Soluble in aromatic hydrocarbons and lacquer solvents. Viscosity (G.H.), Z2-Z4. Color (G.H. 1933), 9-11. Acid value of plastics, 25-35. Wt./gal., 8.40-8.45. Suggested Uses: For fast drying primers and finish coats; also can be utilized in lacquer formulation. Stroock & Wittenberg.

AROPLAZ 1328

Medium long, oil modified, oxidizing alkyd resin. (50% solids in mineral spirits). Has unusual flexibility characteristics. Good solubility in petroleum hydrocarbons. Viscosity (G.H.), W-Y. Color (G.H. 1933), 5-10. Acid value of plastic, 6-10. Wt./gal., 7.70-7.76. Suggested Uses: In Maritime Specification Red Lead Primer MC-52-A1. Adaptable for other exterior, interior or marine protective coatings. Stroock & Wittenberg.

AROPLAZ S-252

Non-oxidizing, oil modified alkyd resin. (70% solids in xylol). Lends flexibility, has film forming and resistance characteristics. Soluble in aromatic hydrocarbons and lacquer solvents. Viscosity (G.H.), Z2-Z4. Acid value of plastic, 6-8. Color (G.H. 1933), 15-25. Wt./gal., 8.15-8.20. Suggested Uses: As plasticizer for nitrocellulose, ethyl cellulose, vinyl compounds, other alkyds, etc., in various protective coating formulations. Stroock & Wittenberg.

AROPLAZ S-284

Short oil, oxidizing alkyd resin. (60% solids in xylol). Fast in solvent release and rapid drying; good flexibility. Viscosity (G.H.), Z1-Z3. Color (G.H. 1933), 6-8. Acid value of plastic, 18-25. Wt./gal., 8.45-8.50. Soluble in aromatic hydrocarbons; will tolerate addition of some petroleum solvents. Suggested Uses: In aeronautical primers and finish coats; also in other fast drying, high quality paints and enamels. Stroock & Wittenberg.

dl-ASPARTIC ACID

$C_4H_7O_4N$. Mol. wt., 133. Appearance, a white crystalline solid; is only slightly soluble in water at room temperature and appreciably soluble in water at its boiling point. A dicarboxylic acid mono basic material. Status: Laboratory product, not demonstrated on plant scale. Monsanto Chemical Co.

AZELAIC ACID

$COOH(CH_2)_7COOH$. Combining wt., 93-95. Sp. gr., 1.030 @ 25°/4°C. Solid flaked material. Melting point, about 96°C. Boiling point, decomposes around 360°C. atm. press. Solubility, slightly soluble cold water, infinitely soluble hot water, soluble alcohol, ether. Color, light tan. Odor, slight. Chemical Properties: Has the usual properties of dibasic acids forming salts, esters, acid halides, etc. With glycerine and similar polyhydric alcohols forms soft alkyd resins. Suggested Uses: In manufacture of plasticizers, resins, salts, perfumes and other organic chemicals. Available in limited commercial quantities. Cont. cartons (75 lbs). Emery Industries, Inc.

AZOBENZENE

$C_6H_5—N=N—C_6H_5$. Mol. wt., 182.10. Orange-red rhombic crystals. Melting point, 68°C. Boiling point, 297°C. Deep red vapor. Sparingly soluble in water. Soluble in ethyl alcohol, ethyl ether, acetic acid, ligroin. Soluble in conc. H_2SO_4 with sulfonation. Heat of combustion, Cv 1555:0 Cal. Available in limited commercial quantities. National Aniline Div., Allied Chemical & Dye Corp.

BEESWAX REPLACEMENTS WHITE NO. 776 AND YELLOW NO. 619

Synthetic substitute for natural beeswax having the same chemical constants as the U.S.P. grade. Cornelius Products Co.

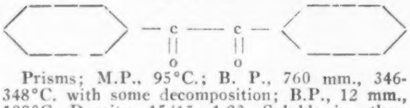
BENZENE SULFONAMIDE

$C_6H_5SO_2NH_2$. Mol. wt., 157. Crystallizing point, 152°C. min. Appearance, fine crystalline material. Suggested Uses: Intermediate in chemical synthesis; plasticizer. Status: Process demonstrated but not in production. Monsanto Chemical Co.

BENZENE SULFONCHLORIDE

$C_6H_5O_2SC$. Crystallizing point, 15.4°C. Assay, 99.0%. Appearance, colorless liquid. Suggested Uses: Primarily in chemical syntheses. Status: Process demonstrated but not in production. Monsanto Chemical Co.

BENZIL



Prisms; M.P., 95°C.; B. P., 760 mm., 346-348°C. with some decomposition; B.P., 12 mm., 188°C. Density, 15/15, 1.23. Soluble in ether, alcohl, acetone, sulfuric acid; insoluble in water. Undergoes many typical carbonyl reactions as well as reactions characteristic of α β diketones. Suggested Uses: In dyes and pharmaceuticals. E. I. du Pont de Nemours Company, Inc.

BENZOTHIAZOLE

C_7H_5NS. Mol. wt., 126. Refractive index, N_D^{25} 1.636. Sp. gr., 1.23 @ 20°/14°C. Boiling point, 230°C/750 mm. Appearance, white on distillation, gradually darkens in light. Odor, disagreeable. Chemical reactions: Reacts with sulfur to form 2-mercaptobenzothiazole, hydrolyzed by caustic fusion to give 2-amino-thiophenol. Suggested Uses: Plasticizer, rubber softener, dyestuff intermediate. Available in sample quantities only. Monsanto Chemical Co.

BENZYLTRIMETHYLAMMONIUM CHLORIDE

$C_6H_5CH_2N(CH_3)_3Cl$. A neutral salt, highly soluble in water. Chemical Properties: The anhydrous material is stable up to about 140°C., but with further heating it decomposes to form benzyl chloride and trimethylamine. Offered in the form of an aqueous solution containing approximately 62% benzyltrimethylammonium chloride by weight. Properties of 62% aqueous solution: Sp. gr., 20°/20°C., 1.07; pH (0.1 M solution), 8; refractive index, 20°C., 1.472; freezing point, °C., less than 50. Commercial Solvents Corp.

BERYLLIUM METAPHOSPHATE

$Be(PO_3)_2$. Physical form: White, porous powder or granular material. Properties: Has a high melting point, insoluble in water. Suggested Uses: As a raw material for special ceramic compositions; as a catalyst carrier. Availability: Laboratory samples. Monsanto Chemical Co.

BORON, AMORPHOUS

B. At. wt., 10.82. Sp. gr., 1.73. App. density, 0.225. Melting point, 2300°C. Boiling point, 2550°C. Soluble in nitric acid, sulfuric acid. Insol. hydrochloric acid, water, alk. Suggested Uses: Addition to alloys, antioxidant, hardner. Available in commercial quantities. F. W. Berk & Co., Inc.

BUNA DISPERSION 186-23

Buna S latex dispersion containing 40% solids yielding waterproof films of higher tensile strength than may be obtained with unvulcanized dispersion. Suggested Uses: Applications involving coating, saturation and adhesive compounding for both porous and non-porous surfaces. American Resinous Chemicals Corp.

n-n-BUTYL BENZENE SULFONAMIDE

$C_6H_5SO_2NHC_4H_9$. Mol. wt., 213. Sp. gr., 1.1464 @ 25°C. Refractive index, 1.522 @ 25°C. Appearance, clear liquid. Suggested Uses: Plasticizer for cellulose acetate, cellulose nitrate and ethyl cellulose. Status: Process demonstrated but not in production. Monsanto Chemical Co.

BUTYL "CELLOSOLVE" ACETATE

$C_4H_9OCH_2CH_2OOCCH_3$. Specific gravity at 20/20°C., 0.940. B. P., 191.5°C. Refractive Index, 1.4160. Solubility in water at 20°C., 1.1%. Colorless, stable liquid with a pleasant ester-like odor. Uses: Because it possesses high solvent powers for nitrocellulose, cellulose esters, and synthetic resins, it may be used in special surface coatings, printing inks, and varnish removers. Available only in "research" quantities. Carbide and Carbon Chemicals Corp.

BUTYL "CELLOSOLVE" OLEATE, S-817

Empirical formula, $C_{24}H_{46}O_3$. Mol. wt., 382.6. Consistency, fluid. Color, dark yellow. Sp. gr., 0.892 @ 25°C. Solidif. point, —45 to —10°C. Sap. value, 140-148. Iod. value, 63-71. Volatility, 0.04% (4 hrs. @ 105°C.). Acidity, 0.1 mg. KOH/g max. Soluble in alcohols, ketones, esters, aromatic and aliphatic hydrocarbons. Insoluble in water. Compatible with nitrocellulose and ethyl cellulose. Suggested Uses: Plasticizer for nitrocellulose, ethyl cellulose, synthetic resins. Glyco Products Co., Inc.

BUTYL DISPERSION G2-5

Emulsion of butyl rubber. Film deposited from this system resembles in strength and general properties the film deposited from GR-I stock. The dispersion is non-inflammable. Suggested Uses: Coating, combining and impregnation applications. American Resinous Chemicals Corp.

BUTYL OLEATE, SULFATED (Nopco 1920-X)

$C_{17}H_{34}$ (OSO_3Na) $COOC_4H_9$. Mol. wt., 450 approx. Color, light brown. Liquid at room temperatures. Soluble in water in all proportions. Suggested Uses: Dyeing assistant for textiles, leveling agent in coloring paper, wetting agent for aiding dispersibility of starch, and wetting agent for paint and lacquer emulsions. National Oil Products Co., Inc.

BUTYL PALMITATE (Nopco 2067)

$C_{15}H_{31}COOC_4H_9$. Mol. wt., 312. Sp. gr., 0.87 at 25°C. Boiling range, 210-250°C. @ 20mm. Liquid at room temperatures. Color, light lemon yellow. Insoluble in water, soluble in alcohol, fats, oils, and the more common organic solvents. Suggested Uses: Lubricant for textiles, leather, paper stencils, metal parts, and plasticizer in plastic compositions. May be used in cosmetic preparations, printing inks. National Oil Products Co., Inc.

"B" WAX

Synthetic beeswax. Sap. value, 93. Direct acid no., 20.3. Ester no., 73. Ratio no., 3.6. Melting point, 70°C. Sp. gr., 0.950. Odor, faint and honeylike. Will not turn rancid. Fracture is dull, granular, plastic, and slightly flaky. Good emulsifying properties. Completely soluble in most organic solvents and oils; insoluble in water. Suggested Uses: Beeswax substitute in manufacture of cosmetics, protective coatings, polishes, greases and soaps. National Wax Refining Co.

CALCIUM HYPOCHLORITE

$Ca(ClO)_2$. Mol. wt., 143. Approximate chemical analysis: $Ca(ClO)_2$, 50%; NaCl, 40%; $CaCO_3$, 3%; $Ca(OH)_2$, 3%; H_2O, 1%. White, free-flowing powder, practically dustless, non-hygroscopic. Water soluble. Loss of available chlorine in storage is low. Suggested Uses: Mfr. indigo, intermediates, organic chemicals, anthranilic acid, as laundry and textile bleach; germicide and deodorant in dairy, food plants, swimming pools, water works, etc.; bleaching paper, pulp, etc.; sugar refining; in medicine. Diamond Alkali Co.

CALCIUM MAGNESIUM PYROPHOSPHATE

$Ca_2Mg_2(P_2O_7)2$. Mol. wt., 476.88. Technical grade. Appearance, grey powder. Insoluble in water; soluble in acids. Suggested Uses: In ceramic industry as constituent of porcelains and enamels. Available for experimental investigation. Monsanto Chemical Co.

CALCIUM PYROPHOSPHATE

$Ca_2P_2O_7$. Mol. wt., 254.2. White powder. Odor, none. Taste, none. Solubility, insoluble in water; soluble in acids. Melting point, 1230°C. Suggested Use: As a source of calcium and phosphorus in mineral enrichment of foods. As a constituent of porcelains and enamels. Availability: Commercially available. Monsanto Chemical Co.

CAPROLACTAM

F.P., 68.8°C.; B.P. (10 mm.), 136-138°C. Suggested Use: Making high molecular weight polyamides. E. I. du Pont de Nemours Company, Inc.

CARBOCERA NO. 1191

Replacement of carnauba and other high-melting waxes in the manufacture of carbon paper inks. Cornelius Products Co.

CASTOR OIL, SULFATED HYDROGENATED (Nopco Shco)

$[C_{17}H_{34}\ (OSO_3Na)\ COO]_3\ C_3H_5$. Mol. wt., 1230 approx. Light brown paste dispersible in warm water forming stable dispersions. Suggested Uses: Ingredient of ointment bases and pharmaceutical preparations. National Oil Products Co., Inc.

"CELLOSIZE" HYDROXYETHYL CELLULOSE WS

Sp. gr., 1.035 to 1.040 @ 20/20°C. Solubility in water, complete. Flash point, none (dried film burns less readily than paper). pH, 6.0 to 7.0. Aqueous solution containing 10% of hydroxyethyl cellulose. Good light and heat stabilities. On drying, produces an almost colorless film of high tensile strength. Suggested Uses: For sizing applications in which starches, gums, gelatins, and soluble resins are used in textile finishing, paper sizing, and in shoe and leather dressings. In textile printing pastes, tends to increase the solubility of the dyestuff in the printing vehicle. Is a good protective colloid for the aqueous dispersion of oils, fats, waxes, and pigments. Shows promise in the field of emulsion polymerization in the manufacture of synthetic resins and elastomers and in water paints since it can bind large amounts of pigments. Carbide and Carbon Chemicals Corp.

"CELLOSOLVE" RICINOLEATE, S-816

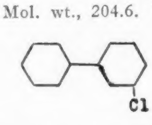
Empirical formula, $C_{22}H_{42}O_4$. Mol. wt., 370.57. Consistency, fluid. Color, yellow. Sp. gr., 0.929 @ 25°C. Sap. value, 150 to 155. Iod. value, 69 to 73. Volatility, 0.14% (4 hrs. @ 105°C.). Solidif. point, not frozen at —70°C. Acidity, 0.1 mg. KOH/g max. Soluble in alcohols, ketones, esters, aromatic and aliphatic hydrocarbons. Insoluble in water. Compatible with nitrocellulose and ethyl cellulose. Suggested Uses: Low temperature plasticizer for nitrocellulose, ethyl cellulose, synthetic resins, polyvinyl butyral. Glyco Products Co., Inc.

2-CHLORO-2'-(4-CYCLOHEXYLPHENOXY) DIETHYL ETHER (K-965)

Cl $CH_2CH_2.O.CH_2CH_2.O.C_6H_4.C_6H_{11}$. Mol. wt., 282.8. Colorless to pale straw-colored liquid. Boiling point, 190°C. at 0.1 inch Hg; sp. gr., 1.095 at 25/25°C.; refractive index, 1.528 @ 25°C.; viscosity, 47.7 centipoises at 25°C. Miscible with most of the common organic solvents; insoluble in water. Suggested Use: As a fabric pest deterrent. The Dow Chemical Co.

2-CHLORO-4-PHENYLPHENOL Dowicide 4

Mol. wt., 204.6. White crystals with a characteristic odor. Melting point, 78-80°C.; boiling point, 323°C.; flash point, 174°C. Soluble in acetone, benzene, carbon tetrachloride, ether, ethyl alcohol, ethylene glycol, methanol and propylene glycol. Very slightly soluble in water. Suggested Use: In special germicides where a high germicidal efficiency is desired. The Dow Chemical Co.

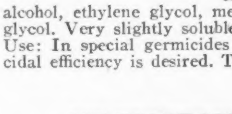


α-CHLOROPROPIONIC ACID

$CH_3.CHCl.COOH$. Mol. wt., 108.5. Colorless liquid with a characteristic odor. Boiling range, 5-95%, 183-190°C.; sp. gr., 1.26 @ 25/25°C.; freezing point, less than —20°C.; refractive index, 1.434 @ 25°C. Completely miscible at 25°C. with acetone, benzene, carbon tetrachloride, ether, methanol, and water, and soluble in VMP Naphtha. The Dow Chemical Co.

2-CHLORO-2'-TETRACHLOROPHENOXY DIETHYL ETHER K-1127

Mol. wt., 338.4. Colorless, odorless liquid. Boiling point, 170-176° C. at 1 mm. Hg; freezing point, 31° C.; sp. gr., 1.506 at 25/25°C.; viscosity, 56.1 centipoises at 25°C.; refractive index, 1.563 at 25°C.; flash point, 202°C. Miscible with petroleum oils and the common chlorinated hydrocarbon solvents. Suggested Use: As an insecticide in the control of household pests. The Dow Chemical Co.



CHLORPROPANE WAX

$CCl_3CCl_2CCl_3$. Mol. wt., 320. Softening point, 110 to 120° C. Boiling range, 210 to 270°C. Color, white crystalline wax, mild camphor-like odor. Insoluble in water, soluble in alcohol, ether and chlorinated solvents. Suggested Uses: Plasticizer, dielectric wax, pyrotechnic compositions, lubricant to withstand chemical attack. Hooker Electrochemical Co.

CLORAFIN 70

Pale, brittle, resinous material made by highly chlorinating paraffin. Soluble in variety of organic solvents. Nonflammable. Suggested Uses: Formulating flameproof coatings. Hercules Powder Co.

CORPOLIN

Colorless, odorless, heavy, non-volatile liquid, miscible with water and many organic liquids; resembling glycerin in appearance and feel. Highly hygroscopic. Suggested Uses: As a plasticizing agent for paper and other products, as an ingredient in textile vat printing paste, in sizing and finishing. Recommended when moisture attraction or retention is desired. The Aktivin Corp., Subsidiary of Heyden Chemical Corp.

COSMETOL N

Water soluble, alkalol amine salt of High Foam. Water white clear viscous liquid, with faint pleasant odor. 1% sol. has a pH of 5.45 and a surface tension of 36 dynes/cm. Wetting time of 0.1% active ingredient is 30 sec. (Draves Test). Toxicity: Same as in High Foam: U. S. Patents No. 2,189,803, 2,184,770 and 2,236,541; also Patents Pending. Suggested Uses: Soapless shampoo, wetting and cutting agent in brushless shaving creams, detergent and bubble bath base, penetrating and lathering agent. The Emulsol Corp.

CYCLOHEXANONE OXIME

White crystal solid; M.P., 88°C. Suggested Use: Intermediate in Caprolactam synthesis and in other oxime reactions. E. I. du Pont de Nemours Company, Inc.

p-CYMENE, Technical (*p*-Isopropyl Toluene)

Purity 95% min. Sp. gr., 0.860 (approx.). Rrefractive index, 1.486-1.490. Boiling range, 175°C. (5% over) to 180°C. (95% over). Suggested Uses: Raw material for synthesis of carvacrol, thymol, other aromatic chemicals. Hercules Powder Co.

DEHYDRACETIC ACID (Dehydranone)

$CH_3COCHCOCH{:}C(CH_3)OCO$. Mol. wt., 168.06. M.P., 108°C. @ 760 mm. Vapor pressure, 0.1 mm. @ 20°C. Solubility in water, 0.1% @ 20°C. Color, white. Camphorlike plasticizer, compatible with nitrocellulose, polystyrene, methacrylate, and Vinylite resins. Suggested Uses: Its multiplicity of carbonyl groups makes it a promising intermediate in chemical synthesis. Available in "research" quantities only. Carbide and Carbon Chemicals Corp.

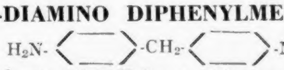
DEODOL D

Acid stabilized higher fatty acid esters. Cream colored, waxy hard solid with a faint odor. Disperses in water easily. 1% dispersion has pH of 3.8, and a surface tension of 34.2 dynes/cm. Acidity expressed as hydrochloric acid, 2.7%; sp. gr., 0.98; titre, 51° to 52°C. (Contains no soap.) Non-irritating and has good emolient properties. U. S. Patent Pending. Suggested Uses: Acid emulsifier for cosmetic and pharmaceutical creams. Useful for preparation of stable aluminum chloride creams for anti-perspiration purposes. The Emulsol Corp.

DIALLYL SUCCINATE

$C_3H_5OCOCH_2CH_2COOC_3H_5$. Mol. wt., 198.21. Boiling point, 145°C (26 mm.). Colorless, oily liquid, mild odor, insoluble in water, soluble in benzene, alcohol, ether, etc. (Technical grade, yellowish in color.) Suggested Uses: Polymerizing plasticizer, in plastics. Available in pilot plant quantities. WPB permission required. Shipping Regulations: Chemicals, NOIBN. The Edwal Lab., Inc.

4,4'-DIAMINO DIPHENYLMETHANE



Mol. wt., 198.3 Yellow to light brown crystalline solid with a faint amine-like odor. Melting point, 87.5-91.5°C. Solubility at 25°C. in grams per 100 grams of solvent: acetone - 2, benzene - 11, carbon tetrachloride - 0.5, ether - 13, methanol - 165, VMP Naphtha - 0.6, water - 0.06. The Dow Chemical Co.

DIBUTYL CELLOSOLVE AZELATE (Plasticizer X-59)

$C_4H_9OCH_2CH_2OOC(CH_2)_7COOCH_2CH_2OC_4H_9$. Mol. wt., 388 (average). Sp. gr., 0.9727 @ 15.5°/15.5°C. Freezing point, below—50°C. Boiling range (10 mm.), up to 225°C., 27% over, 225°-245°C., 26% over, 245°-265°C., 42% over, above 265°C., 5% over. Acid number, 3 (max). Solubility, insoluble in water, soluble alcohol and ether. Color, light yellow. Odor, mild. Chemical Properties: Stable to heat, light and hydrolysis. Suggested Uses: As plasticizer for nitrocellulose, cellulose acetate and cellulose acetate-butyrate, ethyl cellulose, methyl methacrylate and the vinyl resins. Especially suitable for low temperature plasticization of polyvinyl butyral resins. Available in pilot plant quantities for experimental use. Emery Industries, Inc.

DIBUTYL PHENYLPHOSPHONATE

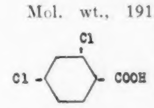
$C_6H_5PO(OC_4H_9)_2$. Mol. wt., 270. Sp. gr., 1.033 @ 28°C. Boiling point, 161°C. (3 mm.). Soluble in alcohol, organic solvents. Insoluble in water. Free acidity, ml. N/10 NaOH/10 ml., 0.4 (phenolphthalein). Colorless liquid. Chemical Properties: Neutral. Thermally stable. Suggested Uses: Plasticizer, lubricant, lubricating oil additive. High boiling solvent. Additive for cellulose plasticis as fire retardant. Available only in small quantities for experimental investigation. Victor Chemical Works.

DICALCIUM PHOSPHATE DEHYDRATE, Stabilized

$CaHPO_4.2H_2O$. White, tasteless crystalline powder. Very slightly soluble in water, insoluble in alcohol and glycerine. Soluble in dilute citric acid solution. Stability, retains water of crystallization and remains free-flowing during prolonged storage under abnormal conditions. Does not set up in tooth paste preparations. Suggested Uses: Medicinal; mineral supplement for foods; polishing ingredient in tooth pastes. Availability: Commercially available. Monsanto Chemical Co.

2,4 DICHLOROBENZOIC ACID

Mol. wt., 191.02. Needles. M. P., 164°C.



Soluble in ethyl ether, chloroform, benzene and hot water. Sublimes. Chemical Properties: Shows the typical reactions of an aromatic organic acid. The chlorine atoms are labilized by the presence of the carboxy group and can react with basic compounds. For example, the reaction with p-anisidine produces 2-(p-methoxy-phenylamino)4-chlorobenzoic acid. Suggested Uses: In the synthesis of dyes, pharmaceuticals, and other organic chemicals. Availability restricted under war conditions. National Aniline Div., Allied Chemical & Dye Corp.

α-β-DICHLOROETHYL ACETATE

$CH_3COOCHClCH_2Cl$. Mol. wt., 157.0. Sp. gr., 1.296 @ 20°C. Boiling point, 59-64°C. @ 11 to 15 mm. Melting point, less than —32°C. Flash point, 152.6°F. Odor, slightly lacrymatory. Colorless liquid. Miscible with alcohol and ethyl ether, immiscible with water. Color, water-white. Chemical Properties: Reacts with thiourea and similar compounds to form thiazoles. Can be catalytically split into acetyl chloride and chloroacetaldehyde. Reacts with alcohols to form acetals. Suggested Uses: Synthesis of pharmaceuticals and various organic chemicals. Available in laboratory lots for experimental purposes. The Niacet Chemicals Corp.

DICHLOROISOPROPYL ETHER

$(C_3H_6Cl)_2O$. Mol. wt., 171.1. Clear, colorless liquid with a sweet camphoraceous odor. Boiling range, 5-95%, 185-190°C., sp. gr., 1.110-1.112 at 25/25°C.; freezing point, below —20°C.; flash point, 174°F.; refractive index, 1.446 @ 25°C. Completely miscible at 25°C. with acetone, benzene, carbon tetrachloride, ether, methanol; insoluble in water. Suggested Uses: As soil fumigant, in paint removers, in deoiling of wax and as a general solvent. The Dow Chemical Co.

DICYCLOHEXYL

$(C_6H_{11})_2$. Mol. wt., 166.3. Colorless liquid with an aromatic odor. Boiling range, 5-95%, 238-239°C.; sp. gr. at 25/25°C., 0.885; refractive index at 25°C., 1.478; viscosity at 25°C., 3.5 centipoises; freezing point, 3°C.; flash point, 99°C.; power factor, 1000 cycle, 0.006%; dielectric strength greater than 31,500 volts at 0.1" gap; dielectric constant, 1000 cycle, 2.1. Miscible with acetone, benzene, carbon tetrachloride and ether at 25°C. Slightly soluble in methanol at 25°C. Insoluble in water. Suggested Use: As a dielectric. The Dow Chemical Co.

DIETHANOLAMINE

$HO.CH_2CH_2.NH.CH_2CH_2.OH$. Mol. wt., 105.1. Somewhat viscous, straw-colored liquid with an amine-like odor. Boiling point, 269°C.; sp. gr., 1.093 @ 30/25°C.; freezing point, 26°C.; refractive index, 1.473 @ 30°C.; flash point, 285°F. Miscible in all proportions at 25°C. with acetone, methanol, water; insoluble in benzene, carbon tetrachloride, ether, VMP Naphtha. Suggested Uses: As a softening and moistening agent, in gas purification and in organic syntheses. The Dow Chemical Co.

DIETHYLENE GLYCOL DIPELARGONATE (Plasticizer X-55)

The diethylene glycol diester of a low molecular weight fatty acid fraction. Chiefly diethylene glycol dipelargonate, $CH_3(CH_2)_7COO{\cdot}CH_2CH_2OCH_2CH_2OOC(CH_2)_7CH_3$. Mol. wt., 362 (average). Sp. gr., 0.9690 @ 15.5°/15.5°C. Freezing point—15°C. Boiling range (10 mm.), 0-165°C., none, 165°-200°C., 15% over, 200°-240°C., 58% over, 240°-280°C., 12% over, above 280°C., 15% over. Acid number, 3(max.). Solubility, insoluble in water, soluble most common solvents. Color, yellow. Odor, mild. Chemical Properties: Stable to heat, light and hydrolysis. Suggested Uses: As plasticizer for nitrocellulose, cellulose acetate and acetate-butyrate, ethyl cellulose, methyl methacrylate and most vinyl resins. Particularly suitable for low temperature plasticization, or where it is desired to provide flexibility over a wide range of temperature. Available in limited commercial quantities. Cont., 55 gal. returnable drums. Emery Industries, Inc.

DI-2-ETHYLHEXYL PHTHALATE (Flexol Plasticizer Dop)

Stable, light colored, high-boiling, (216°C. at 5 mm.) liquid which is miscible with most organic solvents but is almost insoluble in water. Its evaporation rate is considerably lower than butyl phthalate. Uses: Excellent plasticizer for "Vinylite" resins, particularly the copolymer and polyvinyl chloride types; and it is compatible with nitrocellulose and polystyrene and urea-formaldehyde resins, as well as the Buna and neoprene elastomers. Films of Vinylite resins plasticized with it have good low temperature flexibility, satisfactory light stability and excellent electrical properties. Carbide and Carbon Chemicals Corp.

DIETHYL -*m*- TOLUIDINE

$CH_3C_6H_4N(C_2H_5)_2$. Mol. wt., 163.2. Light yellow liquid. Boiling range, 230.5°C. Commercial grade contains less than 1.5% mono-ethyl *m*-toluidine. Chemical reactions are similar to those of other dialkylated aromatic amines. Hydrogens ortho and para to the amino group are reactive. Suggested Uses: In the synthesis of dyes and other organic chemicals. Available in limited quantities. National Aniline Div., Allied Chemical & Dye Corp.

DIGLYCOL DIACETATE

$(CH_3COOCH_2CH_2)_2O$. Mol. wt., 190.19. Sp. gr., at 20/20°C., 1.1159. Boiling point, 250°C. (760 mm.). Solubility in water, complete. Water-white liquid. Uses: Relatively high-boiling, slow-evaporating solvent for cellulose ester, printing inks and lacquers. It is an excellent solvent for cellulose acetate and is used for preventing blushing airplane dopes. It can be used as a perfume fixative and as a non-discoloring plasticizer for ethyl and benzyl cellulose. Available only in "research" quantities. Carbide and Carbon Chemicals Corp.

2,2' DIHYDROXY 5,5' DICHLORO DIPHENYL METHANE

$(HOC_6H_3Cl)zCH2$. Mol. wt., 269. White crystalline solid. Melting point, 177-178°C. Soluble in alkaline solutions, alcohols and ketones; insolube in water. Color, technical—light tan; pure—near white. Odor, very slightly phenolic. Suggested Uses: As a germicide, fungicide and antiseptic. Ship. reg., NOIBN. Givaudan-Delawanna, Inc.

DIHYDROXY DIPHENYL SULFONE

Color, (technical grade) pink; (purified grade) white to light gray. Melting point, (technical) 170-230°C.; (purified) 230-240°C. Solubility: Water, 4% sol. @ 100°C., insoluble in petroleum hydrocarbon; very slightly soluble in benzene, very soluble in alcohol and ethyl acetate. Technical grade is a mixture of the pp' dihy-

Dihydroxy Diphenyl Sulfone (Cont'd)

droxy diphenyl sulfone with a small amount of the ortho para' diphenyl sulfone. Purified grade is essentially pure pp' dihydroxy diphenyl sulfone. Suggested Uses: As an ingredient in the manufacture of syntans and certain types of plastics and also as a possible antiseptic with action similar to that of phenol without the inherent skin irritant of phenol. Availability: Small quantities for laboratory experimentation at present. Monsanto Chemical Co.

DIMETHYLALKYLAMINE OXIDES

$(CH_3)_2\ C_nH_{2n} + {}_1$ NO or $(CH_3)_2\ C_nH_{2n} -_1$ NO, $C_nH_{2n} +_1$ being a high molecular alkyl radical and $C_nH_{2n}-_1$ being the 9-octadecenyl radical. Available in 20% aqueous sols. Color of aqueous sol., light yellowish. Chemical Properties: Strongly surface active, foaming, stable at boiling. Stable in presence of acids, alkalies or salts. Onyx Oil & Chemical Co.

DIMETHYLBENZYLCETYL AMMONIUM CHLORIDE

$(CH_3)_2\ (C_6H_5CH_2)\ C_{16}\ H_{33}$ N C1. Soluble in water and most organic solvents. Available in 25% aqueous solution. Color of aqueous sol., light yellowish. Chemical Properties: Strongly surface active, foaming, wetting. Stable at boiling. Surface tension of 0.03% sol. @ 30°C., 35 dynes/cm. Stable in the presence of acids, alkali, and salts. Suggested Uses: Germicide and fungicide. Substantive to wool, cotton and rayon. Renders textiles resistant against bacteria, mildew, moth. Imparts a soft hand to textiles. Increases the resistance of direct dyes on cotton and rayon to wet treatments. Available in commercial quantities. Onyx Oil & Chemical Co.

DIMETHYL DIOXANE

Mol. wt., 116.16 Sp. gr. at 20/20°C., 0.9268. B. P., 117.5°C. (760 mm.). Solubility in water, 4.33%. Water-white liquid. Uses: General extractant and solvent for dyestuffs, oils, fats, waxes, and cellulose derivatives. Available only in "research" quantities. Carbide and Carbon Chemicals Corp.

$OCH(CH_3)CH_2OCH_2CH(CH_3)$

DIMETHYLETHANOLAMINE

(Dimethylaminoethanol)

$(CH_3)_2NCH_2CH_2OH$. Mol. wt., 89.14. Boiling point, 133°C. Sp. gr. at 20/20°C., 0.887. Equivalent weight, 89. Refractive Index, 1.4300. Solubility in water, complete. Colorless, amine-odored liquid which is miscible with water and benzene. Its properties are similar to those of diethylethanolamine (diethylaminoethanol) which has been used commercially for many years. Uses: In the synthesis of dyestuffs, textile auxiliaries, pharmaceuticals, and corrosion inhibitors. Carbide and Carbon Chemicals Corp.

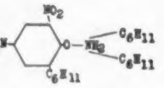
DIMETHYLETHYL-9-OCTADECENYL AMMONIUM BROMIDE

$(CH_3)_2.\ (C_2H_5).\ C_{18}\ H_{35}$ N Br. Mol. wt., 406. Miscible with water and most organic solvents. Available in 10% aqueous sol. and in non-aqueous solvents. Color of aqueous sol., light yellowish. Chemical Properties: Strongly surface active, foaming, wetting. Stable at boiling. Surface tension of 0.03% sol. at 30°C., 35 dynes/cm. Stable in the presence of acids, alkalis and salts. Suggested Uses: Germicide and fungicide. Substantive to wool, cotton and rayon. Renders textiles resistant against bacteria, mildew, moth. Imparts a soft hand to textiles. Increases the resistance of direct dyes on cotton and rayon to wet treatments. Available in commercial quantities. Onyx Oil & Chemical Co.

DINITRO-*o*-CYCLOHEXYLPHENOL, DICYCLOHEXYLAMINE SALT

K-604

Mol. wt., 447.6. Orange crystals. Melting point, 197-198°C. Solubility in water at 25°C., 2.8 mg./100 cc. Limited solubility in common organic solvents. Suggested Use: Insecticide. The Dow Chemical Co.



o-DIPHENYL BIGUANIDE

$C_{14}H_{15}N_5$. Mol. wt., 273. Melting point, above 150°C. pH of a 0.1% water solution, 8.0. Solubility in water, 0.1% @ 25°; in alcohol, 10% @ 25°; in acetone, 5% @ 25°. Appearance, pinkish white. Suggested Uses: As an antioxidant in soap and oils. Available in commercial quantities. Monsanto Chemical Co.

DIPHENYL PHENYLPHOSPHINATE

$C_6H_5P(OC_6H_5)_2$. Mol. wt., 294. Sp. gr., 1.166 @ 26°C. Boiling point, 208°C. (5 mm.). Soluble in alcohol and common organic solvents. Insoluble in water. Colorless to straw-colored liquid. Chemical Properties: Hydrolyzes very slowly in water. Contains trivalent phosphorus. Suggested Uses: Lubricating oil additive, soap preservative, anti-oxidant, plasticizer. Available only in small quantities for experimental investigation. Victor Chemical Works.

DIPHENYL PHENYLPHOSPHONATE

$C_6H_xPO(OC_6H_5)_2$. Mol. wt., 310. Melting point, 63.5°C. Soluble in alcohol, ether, benzene. Insoluble in water. White crystals. Chemical Properties: Stable to hydrolysis by aqueous caustic. Hydrolyzed by alcoholic caustic. Suggested Uses: Plasticizer, lubricating oil additive. Additive for cellulose plastics as fire retardant. Available only in small quantities for experimental investigation. Victor Chemical Works.

DIPHENYL PHENYLTHIO-PHOSPHONATE

$C_6H_5PS(OC_6H_\cdot)_2$. Mol. wt., 326. Sp. gr., 1.221 @ 28°C. Boiling point, 226°C. (1 mm.). Soluble in alcohol, benzene, common organic solvents. Insoluble in water. Heavy, colorless liquid. Darkens in air between 190° to 200°C. without decomposition. Chemical Properties: Stable in water. Slowly hydrolyzed by alcoholic caustic. Suggested Uses: Plasticizer, lubricant, lubricating oil additive. Additive for cellulose plastics as fire retardant. Available only in small quantities for experimental investigation. Victor Chemical Works.

DIPHENYL SULFONE

Melting point, (technical grade) 120-125°C.; (pure grade) 127-129°C. Boiling point, (pure grade) 380°C. @ 760 mm.; 230°C. @ 15 mm. Solubility: Slightly soluble in hot water, soluble in most of the usual organic solvents. Chemical Properties: Diphenyl sulfone can be chlorinated and sulfonated although under certain conditions these and other reactions result in splitting the molecule at the sulfone link. Heating with sulfur or selenium produces diphenyl sulfide or selenide. Suggested Uses: As an intermediate in organic syntheses and in the preparation of diphenyl sulfides, selendides and their derivatives. A possible softener or plasticizer in rubber compounding. Availability: Laboratory quantities in both technical and pure grades. Monsanto Chemical Co.

DIPOTASSIUM PHOSPHATE, Anhydrous

K_2HPO_4. White, hygroscopic powder. Solubility, one hundred grams of water will dissolve 233 grams of K_2HPO_4 at 25°C. Insoluble in alcohol. Concentrated aqueous solutions are miscible with glycerine. pH, subject to control over range of about 8.8 to 9.6, basis 1% aqueous solution. pH of pure K_2HPO4 is 9.2. Very hygroscopic. At 25°C. and 35% relative humidity, K_2HPO4 absorbs water to form a 70% solution. More dilute solutions are formed at higher humidities. Electrical conductivity, good electrolyte in aqueous solution. Suggested Uses: Humectant; anti-static agent for textile fibers; in fermentation; for correcting salt balance in evaporated milk. Availability: Pilot-plant quantities. Monsanto Chemical Co.

DIPROPYLENE GLYCOL

$CH_3.CHOH.CH_2.O.CH_2.CHOH.CH_3$. Mol. wt., 134.2 Clear, colorless to pale straw-colored liquid. Boiling range, 5-95%, 220-240°C.; sp. gr., 1.030-1.040 @ 25/25°C.; acidity (as acetic acid), 0.01% max.; water content, 0.1% max.; color (APHA), 40 max. Suggested Uses: As a printing ink solvent, as a plasticizer for cellulose fibers and in the paper industry and as a moisture control agent in foundry sands. The Dow Chemical Co.

DN-111

Yellow powder, readily dispersible in water. Suggested Uses: Insecticide in the control of common species of red spiders and mites. The Dow Chemical Co.

DOWSPRAY 17

Yellow powder readily dispersible in water. Suggested Uses: Insecticide for the control of red mite and thrips on certain greenhouse plants. The Dow Chemical Co.

DOWSPRAY 66

Buff-colored flaked material, readily soluble in water. Suggested Uses: Killing of potato vines under certain conditions so as to prevent further development of blight and eliminate second growth in the field, to reduce loss caused by rot in storage and to aid in harvesting the crop. The Dow Chemical Co.

DP SOLUTION - 4519

An alcohol solution of an organic pyrophosphate. Color, pale straw. Wt. per gal., 8.2 lbs. Suggested Uses: Inhibitor for preventing discoloration of clear nitro cotton solution stored in steel drums. Permits use of steel drums rather than tin lined drums for this purpose. Availability: Commercial quantities for war uses. Monsanto Chemical Co.

EMCOL 3-L Pure

Water soluble cationic reagent with good foaming and detergent properties in acidic pH. Suggested Uses: In textile and fur processing; in acid cosmetics; as flotation reagent in the mining industries; for ex., floating of silica from phosphates, manganese ores, etc. The Emulsol Corp.

EMCOL 3-S Pure

Cationic reagent having properties similar to those of EMCOL 3-L, but less soluble in cold water. Suggested Uses: Good acid emulsifier. The Emulsol Corp.

EMCOL 12

Fatty acid ester of a polyhydroxy alcohol containing 3 free hydroxy groups. Clear viscous liquid, amber-colored and slightly caramel odor. Disperses easily and a 1% dispersion has a pH of 7.05. Free fatty acid expressed as oleic acid, 4% to 5%; sp. gr., 1.01. (Contains no soap.) Not toxic. Suggested Uses: Edible, innocuous emulsifier for pharmaceutical, cosmetic and food emulsions. Non-ionic wetting agent and detergent. The Emulsol Corp.

EMCOL 14

Liquid fatty acid ester of a polyhydroxy alcohol, containing esters with more than 3 unesterified hydroxy groups; similar to Emcol 12. Clear viscous liquid, amber colored and slightly caramel odor. Disperses readily. 1% dispersion has a pH of 8.3 and a surface tension of 32.7 dynes/cm. Free fatty acid expressed as oleic acid, 0.5% to 1%; sp. gr., 0.99. (Contains no soap.) Non-toxic. Suggested Uses: Edible emulsifier for food, cosmetic and pharmaceuticals. The Emulsol Corp.

EMCOL 18

Palmitic and stearic ester of a polyhydroxy alcohol, similar to Emcol 12. Cream colored, wax-like solid with a slight caramel odor. Disperses easily. 1% dispersion has a pH of 7.5-8. Free fatty acid expressed as oleic acid, 2% and 3%. (Contains no soap.) Suggested Uses: Edible hardner and emulsifying agent, for food, cosmetic and pharmaceutical emulsions, lipsticks and base for dye dischargers. The Emulsol Corp.

EMCOL CA

Glyceride of palmitic and stearic acids with free hydroxy groups. Cream colored, waxy, hard solid with a faint, pleasant odor. Iodine value of fatty acid constituent is less than 3. Disperses easily in water and is self-emulsifying. 1% dispersion has a pH of 8.9, and a surface tension of 43.9 dynes/cm. Free fatty acid, expressed as oleic acid, 10% to 11%; sp. gr., 1.02; titre, 57° to 58°C. Contains from 10% to 12% of potassium stearte (not added), an integral component of the reaction. Suggested Uses: Preparation of oil-in-water emulsions for pharmaceutical and cosmetical creams and lotions. Preparation of greasless creams such as cleansing creams, cold creams, vanishing creams, brushless shaving creams, hand creams, hand

lotions, after shaving lotions, massage creams, sun tan creams, liquid facial creams, liquid balms and lotions. Imparts good emolient properties; also gives good stabilizing properties to beeswax creams when used as addition agent in quantities of 1 to 2%. The Emulsol Corp.

EMCOL CD

C_{16} and C_{18} fatty acid esters of a polyglycol. Cream colored to almost white, waxy, soft solid practically odorless. Iodine value of the fatty acid constituent is less than 3. Disperses with ease in water and is self-emulsifying. 1% dispersion has a pH of 8.5-9 and a surface tension of 41 dynes/cm. Free fatty acid expressed as oleic acid, 10% to 11%; sp. gr., 1.01; titre, 52° to 53°C. (Contains from 10% to 12% of potassium stearate (not added), an integral component of the reaction. Suggested Uses: Emulsifying agent for oil-in-water emulsions. Stabilizing agent and detergent for cosmetic creams. Used similarly to Emcol CA as listed. The Emulsol Corp.

EMCOL CE

High molecular fatty acid ester of a glycol. Almost white, waxy, soft solid with faint pleasant odor. Disperses in water completely. 1% dispersion has a pH of 8.5-9 and a surface tension of 42.1 dynes/cm. Free fatty acid expressed as oleic acid, 10% to 11%; sp. gr., 1.04; titre, 51° to 52°C. Contains from 10% to 12% of potassium stearate (not added), an integral component of the reaction. Suggested Uses: Emulsifying agent for oil-in-water lotions and creams for cosmetics and pharmaceuticals. Used in preparation of cosmetic creams designated under Emcol CA. The Emulsol Corp.

EMCOL DS

A polyglycol stearate. White, practically odorless waxy soft solid. Disperses easily in water. 1% dispersion has a pH of 7.1. Contains no soap or amines. Free fatty acid expressed as oleic acid, 0.2% to 0.5%; sp. gr., 0.99; titre, 43° to 44°C. Suggested Uses: Emulsifier for oil-in-water emulsions especially of the neutral type. Cosmetic detergent. The Emulsol Corp.

EMCOL EMS

Combination of an edible sulphoacetate derivative and fatty acide ester of a polyhydroxy alcohol. White, waxy-hard solid, practically odorless. 1% dispersion has pH of 6.9. Free fatty acid, expressed as oleic acid, 2% to 3%; sp. gr., 0.97; titre, 56° to 57°C. (Contains no soap.) Toxicity: Non-toxic and innocuous. U. S. Patent Reissue No. 21,683 and others. Suggested Uses: Edible emulsifier for food, pharmaceutical and cosmetic emulsions. The Emulsol Corp.

EMCOL ES

A glycol stearate. Cream colored, practically odorless, wax-like solid. 1% dispersion has a pH of 5.15. Free fatty acid expressed as oleic acid, 9% to 10%; sp. gr., 1.01; titre, 48°C. to 49°C. (Contains no soap.) Suggested Uses: Addition agent to other emulsifiers to promote more stable oil-in-water emulsions. Cosmetics and pharmaceuticals. The Emulsol Corp.

EMCOL L

Mono-glyceride of C_{12} fatty acid. Almost white to cream colored, medium hard, waxy solid with a slight stearine-like odor. 1% dispersion has a pH of 6.3. Contains no soap or amines. Edible. Free fatty acid expressed as oleic acid, 2% to 3%; sp. gr., 1.02: titre, 53° to 54°C. Non-toxic. Suggested Uses: Edible emulsifier for cosmetics, pharmaceuticals, salves, ointments and foods. The Emulsol Corp.

EMCOL O

Mono and di-glyceride of C_{18} liquid fatty acids. Clear viscous liquid. Amber to light brown color and has pleasant caramel-like odor; gives a milk-like emulsion on homogenization. 1% dispersion has a pH of 8.7. Free fatty acid expressed as oleic acid, 2% to 3%. (Contains no soap.) Suggested Uses: Edible emulsifier for food and cosmetics. Can be used as an auxiliary emulsifier with other emulsifying agents. The Emulsol Corp.

EMCOL PL

Polyhydroxy laurate with strong hydrophillic properties. Pale yellow, clear mobile liquid, with faint odor. Disperses easily in cold water. 1% dispersion has a pH of 5.9 and a surface tension of 26.9 dynes/cm. Free fatty acid expressed as oleic acid, 0.1% to 0.5%; sp. gr., 0.94. (Contains no soap.) Non-toxic. Suggested Uses: Edible grade, emulsifier and wetting agent with good interfacial modifying properties. Used in food, cosmetics and pharmaceutical emulsions. The Emulsol Corp.

EMCOL PO

Oleic acid ester of a polyhydroxy alcohol. Clear mobile liquid, amber colored, with only slight odor. 1% dispersion has a pH of 6.3 and a surface tension of 34.3 dynes/cm. Contains no soap. Free fatty acid expressed as oleic acid, 7% to 8%; sp. gr., 0.93. Non-toxic. Suggested Uses: Edible grade emulsifying agent, for food, cosmetics and pharmaceuticals. The Emulsol Corp.

EMCOL PS

Stearic acid ester of a polyhydroxy alcohol. White, wax-like solid, practically odorless. Free fatty acid expressed as oleic acid, 3% to 4%. (Contains no soap.) Non-toxic. Suggested Uses: Edible emulsifier for food, cosmetics and pharmaceuticals. The Emulsol Corp.

EMCOL RE

Mixture of a mono and di-glyceride of hydrogenated fatty acids. White hard wax. Edible grade. Slight caramel odor. 1% dispersion has a pH of 8-8.5. Free fatty acid as oleic acid, 0.5% to 1%; sp. gr., 1.01 (Contains no soap.) Suggested Uses: Edible glyceride for food, cosmetic and pharmaceutical emulsions. Hardener. The Emulsol Corp.

EMCOL S

Mixture of mono and di-glycerides of saturated C_{16} and C_{18} fatty acids. Practically odorless and creamy white, waxy hard solid. 1% dispersion has a pH of 6.7. Contains no soaps or amines. Fatty acid constituent has an iodine value of less than 3. Free fatty acid expressed as oleic acid, 2% to 3%; sp. gr., 1.01; titre, 56° to 57°C. Suggested Uses: Edible glyceride for food, cosmetic and pharmaceutical emulsions, salves and ointments. The Emulsol Corp.

EMCOL X-1

Anionic wetting agent, soluble in oil and freely dispersible in water. Has pronounced wetting out, detergent and emulsifying properties. Suggested Uses: Textile processing, dispersing agent for insecticides, flotation reagent in mining industry, particularly flotation of tungsten ores. In conjunction with crude oil or oleic acid, it is a good agglomerating agent for potassium chlolride from sylvinite. It is a frother with a minimum of collecting properties for either sulfide or non-sulfide ores and is compatible with water of all degrees of hardness; it may be used in acid, neutral or alkaline circuits. The Emulsol Corp.

EMULSIFIER NO. 20

A neutral, long-chain alkyl phosphate containing a water-solubilizing group. Sp. gr., 1.057 @ 30°C. Soluble in organic solvents, hydrocarbons and oils. Amber, thick liquid. Self emulsifiable in water. Strong emulsifying agent. Suggested Uses: Surface active compound, emulsifier, oil additive. Available only in small quantities for experimental investigation. Victor Chemical Works.

EMULSIFIER NO. 87

A neutral, long-chain alkyl phosphate containing a water-solubilizing group. Sp. gr., 0.975 @ 77°C. Melting point, 48-50°C. Soluble in organic solvents, hydrocarbons and oils. Waxy solid. Self-emulsifiable in warm water giving thickened solutions. Forms creamy emulsions of the oil-in-water type. Suggested Uses: Emulsifier, oil additive, thickener. Available only in small quantities for experimental investigation. Victor Chemical Works.

EMULSIFIER NO. 89

A neutral, long-chain alkyl phosphate containing a water-solubilizing group. Sp. gr., 1.100 @ 25°C. Soluble in water, organic solvents, naphtha and kerosene. Amber liquid. Suggested Uses: Surface active agent, wetting agent, emulsifier. Available only in small quantities for experimental investigation. Victor Chemical Works.

EMULSION 16

Contains 40% solids. Suggested Uses: Extending and modifying natural latex, reclaim, neoprene and Buna S latices. American Resinous Chemicals Corp.

EMULSION 86-7

Resin-modified vinylite emulsion which dries to a slightly tacky water-resistant film. Solids are 30% and are composed predominantly of noncritical resins. Suggested Uses: Tackifying modifier and reinforcing agent for neoprene. Four parts of 86-7 to one part of neoprene is recommended as a starting formulation for adhesive compounding. American Resinous Chemicals Corp.

EMULSION H4-10C

50% solids. Gives 24 hours pressure sensitivity. Does not impair strength of the synthetic rubbers. Suggested Uses: Tackifying emulsion for neoprene and Buna S latices. Resinous extender for vinyl emulsions to which it tends to impart water resistance. American Resinous Chemicals Corp.

EMULSION CLEANER CONCENTRATE (Pensalt EC No. 2)

Concentrate type emulsion cleaner comprising soaps, blending agents, and co-solvents for industrial grease cleaning application. Soluble in water and hydrocarbon solvents. Diluted with 5 to 20 parts of low-cost kerosene, Stoddard solvent, or light fuel oil distillate. Suggested Uses: Emulsifying solvent in removing carbonized oils, grease, smut, and drawing and buffing compositions. Precleaner prior to electroplating, yielding a physically clean surface. Also applicable to power washer and soak tank operations in water emulsion form or to increase effectiveness of alkaline cleaners. Packed in 55 gal. steel drums; no shipping restrictions. Pennsylvania Salt Mfg. Co.

EMULSOL 607

Special (Anhydrous)

Fine crystalline powder; quaternary ammonium derivative of the pyridine-betaine type. 10% aqueous soloution is pale amber to substantially colorless sol. and 1% conc. is water white. Practically odorless. 1% sol. has pH of from 5 to 5.5 and a surface tension of 36 dynes/cm. Germicidal Characteristics: Average phenol coefficients according to official Food & Drug Administration method: S. aureus @ 20°C—420, @ 37°C—500; E. typhosa @ 20°C—220, @ 37°C—340. Suggested Uses: General antiseptic and germicide against both gram-positive and gram-negative organisms. Effective in dilute solutions. Has good detergent properties. Can be used in pharmaceuticals and cosmetics; in hair washes, antiseptic creams and lotions, tooth powders, tooth pastes, mouth washes, etc.; in the sterilization of surgical instruments, hospital equipment, food utensils, dairy equipment, etc. Promotes oil-in-water emulsions. The Emulsol Corp.

EMULSOWAX NO. 1215

Carnauba substitute. Suggested Uses: Refined and prepared for use in the manufacture of self-polishing water emulsion floor waxes and liquid shoe polishes. Produces llight colored, waterproof, glossy and non-tacky emulsions of good stability. Cornelius Products Co.

ETHOCEL, LT

A modified Ethocel (Dow ethyl cellulose) molding plastic having improved shock resistance at the low temperatures encountered in military operations. The Dow Chemical Co.

2 ETHYLBUTYL ETHER OF ETHYLENE GLYCOL

(2-Ethylbutyl "Cellosolve")

$(C_2H_5)_2CHCH_2OCH_2CH_2OH$. Mol. wt., 146.22. Sp. gr., 0.8952 @ 20/20°C. B.P., 197.4°C. (760 mm.). Freezing point, below −90°C. Refractive index, 1.4305 @ 20/20°C. Flash point, 180°F. Solubility in water, 1.4% @ 20°C. Solubility of water in it @ 20°C., 10.0%. Colorless. Suggested Uses: Of particular interest where a lower water solubility or greater hydrocarbon solubility is desirable. Shows promise as a mutual solvent or coupling agent for making homogeneous two phases that are ordinarily incompatible with each other. Should be useful in dry-cleaning soaps, soluble oils for textile and leather applications, and metal-cutting and insecticide oils. Is a plasticizer intermediate, and has good solvent properties for dyestuffs and wood stains. Carbide and Carbon Chemicals Corp.

ETHYL CHLOROACETAL

$CH_2ClCH(OC_2H_5)_2$. Mol. wt., 152.6. Sp. gr., 1.022 @ 20°C. Melting point, less than −32°C. Boiling point, 55-59° @ 17-22 mm. Flash point,

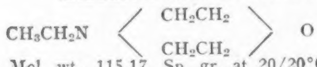
ETHYL CHLOROACETAL (Cont'd)

116.6°F. Odor, pleasant characteristic. Color, water-white. Miscible with alcohol and ethyl ether. Not miscible with water. Chemical Reactions: Forms alkoxy or cyclo acetals with sodium ethylate and similar compounds. Combines with ammonia and amides to give the corresponding acetals. K_2S replaces the chlorine with sulfur. Available in laboratory lots for experimental purposes only. The Niacet Chemicals Corporation.

2-ETHYLHEXANEDIOL-1, 3

Sp. gr., 0.9422 @ 20/20°C. Vapor pressure, @ 20°C., less than 0.01 mm. Flash point, 260°F. B. P., approx. 243°C. (760 mm.). Solubility in water @ 20°C., 4.2% and water in it, 11.7%. High-boiling non-volatile, colorless glycol with a faint odor, reminiscent of witch-hazel. Suggested Uses: Probable application in cosmetic field since it resembles glycerine in its softening action on the skin. Has anti-foaming powers. Promising intermediate for making perfume fixatives, plasticizers, and synthetic resins. Ingredient for insect repellents. Available in "research" quantities for the duration. Carbide and Carbon Chemicals Corp.

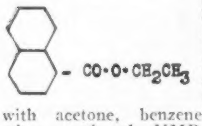
n-ETHYL MORPHOLINE



Mol. wt., 115.17. Sp. gr. at 20/20°C., 0.916. Colorless, water-miscible liquid boiling at 138°C., Uses: Cyclic tertiary amine useful as a solvent for dyes, resins and oils, and as an intermediate in the manufacture of dyestuffs, pharmaceuticals, rubber accelerators, and emulsifying agents. Available only in "research" quantities. Carbide and Carbon Chemicals Corp.

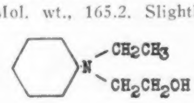
ETHYL-α-NAPHTHYL ACETATE

Mol. wt., 200.2. Clear, colorless to pale straw-colored, practically odorless liquid. Boiling point, 158-160°C. at 3 mm. Hg; sp. gr., 1.106 at 25/25°C.; refractive index, 1.579 at 25°C. Completely miscible at 25°C. with acetone, benzene, carbon tetrachloride, ether, methanol, VMP Naphtha; insoluble in water. The Dow Chemical Co.



ETHYL PHENYL ETHANOLAMINE

Mol. wt., 165.2. Slightly yellow solid. Boiling point, 276°C.; sp. gr., 1.030 at 60/60°C.; freezing point, at least 36°C. Very soluble in alcohol, benzene and carbon tetrachloride. Slightly soluble in water. The Dow Chemical Co.



ETHYL PHOSPHORIC ACID

97% Sol. Color, water white. Odor, none. Sp. gr., 1.34. pH, 1% sol. 1.0, 50% sol. 0.5. Suggested Uses: As catalyst in reactions such as urea aldehyde molding compounds and also of value as rust and corrosion inhibitors. Availability: For government contracts or upon allocation. Monsanto Chemical Co.

EXTENDER F6-8

Suggested Uses: Tackifier for neoprene and Buna S. 10% added to neoprene gives good starting base for adhesive tapes. American Resinous Chemicals Corp.

EXTENDER G3-11

Solvent free alkyd resin dispersion containing 50% solids. Suggested Uses: Modifier for general purpose synthetic rubber latices. Incorporation of 3 parts 163-11 and 1 part synthetic latex yields products of good elastomeric properties and tensile strength. G3-11 modified synthetics are being used in general industrial combining, coating and impregnating of paper, textiles, leather, and natural and synthetic rubber. American Resinous Chemicals Corp.

FABRIC, Coated

Suggested Use: Hospital sheeting and made according to New York Medical Depot Specification 1614X. E. I. du Pont de Nemours & Company, Inc.

FABRIC, DYED PERCALE (Coated)

Suggested Uses: In jungle hammocks and made according to Philadelphia Quartermaster Depot Specification 256B. E. I. du Pont de Nemours & Company, Inc.

FABRIC, SILK (Coated)

Suggested Use: In life raft sail, made according to U. S. Army Air Forces Specification 26756. E. I. du Pont de Nemours & Company, Inc.

FERRIC ORTHOPHOSPHATE

$Fe_3H_3(PO_4)_4 \cdot 6H_2O$. Fe, 25.4%; P_2O_5, 42.4%. Appearance, fine white powder. Apparent density, 0.297. Solubility in water, 0.00024 gm. Fe per 100 cc. water. Solubility in 0.2% HCl, 0.00092 gm. Fe per 100 cc. solution. Solubility in 1.0% HCl, 0.026 gm. Fe per 100 cc. solution. Suggested Uses: As iron addition agent for the mineral enrichment of foods. Available in limited quantities. Monsanto Chemical Co.

FLOOREV NO. 1077

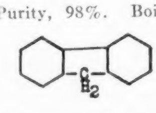
Carnauba replacement. Soluble in the usual hydrocarbon solvents. Suggested Uses: Paste and liquid solvent wax polishes for floors, shoes, automobiles and leather. Forms non-sweating firm products of light color and good gloss. Cornelius Products Co.

FLUOBORIC ACID

HBF_4. Mol. wt., 90. 42% Colorless, clear solution with slight excess boric acid for stabilizing. Sp. gr., 1.33. Suggested Uses: Controlling acidity in lead fluoborate plating baths, synthesis of metallic fluoborates, pickling agent, and preparation of catalysts for esterification, polymerization, and condensation reactions. Glass carboys up to 13 gal. Pennsylvania Salt Mfg. Co.

FLUORENE

Purity, 98%. Boiling point, approx. 295°C. Freezing point, Not less than 113°C. Solubility: Insoluble in water. Soluble in hot alcohols, ketones, esters, ethers, aromatic hydrocarbons and many aliphatic hydrocarbons, and pyridine bases. Suggested Uses: Pharmaceuticals, fluorenone, dyes, fungicide, insecticides, horticulture, and various organic syntheses. Cont.—145-lb. (approximate) barrels. Reilly Tar & Chemical Corp.



FURFURYL MERCAPTAN

O·CH=CH·CH=C·CH₂·SH. Mol. wt., 114.06. Boiling point, 50° (13 mm.), 72° (40 mm.). Colorless liquid which darkens on exposure to light. Odor, noxious; in high dilutions, coffee-like odor. Chemical Properties: Usual mercaptan reactions. Suggested Uses: Has been described for use in synthetic flavoring. Available in experimental quantities. Shipping Regulations: Red label. The Edwal Labs., Inc.

GALEX W-100

Light amber, solid mixture of dehydro-, dihydro-, and tetrahydro-abietic (rosin) acids, prepared by special conversion process. M.P., 62°C. (Ball & Ring.) Acid No. 156-157. Stable to oxidation and other atmospheric conditions. Soluble in most common organic solvents. Forms a crystalline monosulfonate with sulfuric acid. Yields crystalline alkaline salts; stable esters with mono- and polybasic alcohols. Suggested Uses: As a stable, uniform rosin acid material. G. & A. Laboratories, Inc.

GLYOXAL

The simplest dialdehyde. Containing two functional groups, it reacts in many ways additional to those of monoaldehydes such as formaldehyde. Minimum odor and relative non-volatility suggests its use in many applications. Available in "research" quantities as a 30-40 per cent aqueous solution and as a solid bisulfite addition compound. Uses: It shows promise as an insolubilizing agent for compounds containing free amino and hydroxyl groups such as glues, casein, albumin and high molecular weight polyalcohols. Reacts with aromatic diamines, amino phenols and hydrazines to give insoluble colored materials. Reaction products from ammonia and aliphatic amines are of potential interest to the petroleum and pharmaceutical industries. Slight modification of these reactions produces high molecular weight compounds having interesting resin-forming properties. Carbide and Carbon Chemicals Corp.

GRIP-TIGHT PASTE

Resin emulsion adhesive, slightly alkaline. Weight, 8-¾ lbs gal. Soft white buttery paste. Suggested Uses: Permanent adhesive for attaching paper labels to smooth surface materials such as tin cans, metal drums, fibre cans, painted, lacquered, varnished surfaces, glass, hard fibre, many plastics. Supplied in packings from 1 gal. to 55 gal. drums. Paisley Products, Inc.

HAMP WAX

Hard, amorphous petroleum wax of the grease proof type. Possesses high resistance to moisture vapor transmission. Suggested Uses: Alternate for micro crystalline wax, for manufacture of Ordnance papers, waterproofing ends of bags, for export shipments and similar applications where melting point, hardness and other properties of this range are desired. Manufactured in several grades. Not on allocation. May be obtained on application providing use is 100% military or essential civilian. Wishnick-Tumpeer, Inc.

HB-40

A light-colored, mobile, high-boiling, oily hydrocarbon. Sp. gr., 1.00 + .01 at 25/15.6°C. Refractive index, 1.5540 - 1.574 at 25°C. Coefficient of expansion, 0.000741 c.c./c.c./°C. Stability to heat, does not readily oxidize. Appears to be stable in glass at boiling point. Stability to acids and alkalies, stable to boiling 10% H2S04 or 10% NaOH at atmospheric pressure. Distillation range, start 345°C. (corrected), (A.S.T.M. D-20 Modified) 50%, 359°C.; 95%, 420°C. Flash point, 345°C. Fire point, 385°C. Pour point, —28°C. (Note: A few crystals will form if HB-40 is held for a long time at about 2°C. The crystals redissolve at about 5°C.). Viscosity, 136.5 S.U.S @ 100°F.; 38.4 S.U.S @ 210° F. Solubility, insoluble in water. Slightly soluble in 95% alcohol. Miscible in all proportions with usual organic solvents. Compatibility, compatible with many gums and resins. Compatible in all proportions with polystyrene, to the extent of 70 parts HB-40 to 30 parts ethyl cellulose, to the extent of two parts HB-40 to 98 parts cellulose acetate. Suggested Uses: As a solvent; as a plasticizer; as an oil for high vacuum diffusion pumps. Availability: Introductory quantities. Monsanto Chemical Co.

HEXACHLORBENZENE

C_6Cl_6. Mol. wt., 284.7. Melting point, 230°C. Color, white to cream. Insoluble in water, soluble in carbon tetrachloride, monochlorbenzene, toluene. Suggested Uses: Pyrotechnic compositions, ingredient of water proofing and flameproofing compounds. Hooker Electrochemical Co.

HEXACHLORBUTADIENE

$Cl_2C{=}CCl{-}CCl{=}CCl_2$. Mol. wt., 261. Melting point, —20 to —25°C. Boiling range, 210 to 220°C. Sp. gr., 1.65 to 1.70 @ 25°/15.5°C. Color, water white. Insoluble in water, miscible with alcohol, ether, chlorinated organic solvents. Chemical Properties: Highly stable, is not easily hydrolyzed by water or mild alkalies. Suggested Uses: Solvent for rubber, synthetic rubber and other polymeric substances, high boiling non-flammable solvent, non-flammable heat transfer liquid, transformer fluid and hydraulic fluid. Hooker Electrochemical Co.

HEXACHLORETHANE

C_2Cl_6. Mol. wt., 237. Sublimes at 186°C. Color, white, crystals; mild camphor-like odor. Insoluble in water, soluble in alcohol and carbon tetrachloride. Suggested Uses: Pyrotechnic compositions, insecticide, plasticizer and chlorinating agent. Hooker Electrochemical Co.

HEXACHLORPROPYLENE

(Perchlorpropylene)

$CCl_3{-}CCl{=}CCl_2$ Mol. wt., 249. Boiling range, 205 to 215°C. Sp. gr., 176 to 178 @ 25°/15.5°C. Color, water white; mild odor. Insoluble in water, miscible with alcohol, ether and chlorinated solvents. Suggested Uses: Solvent and plasticizer for rubber and other polymeric materials; non-flammable hydraulic fluid. Hooker Electrochemical Co.

HIGH FOAM

Pure crystalline sulphoacetamide derivative. White crystalline. Odorless. 1% in water gives a water white solution at 30°C. Wetting time of a 0.1% sol., 26 sec. (Draves test). 1% sol. has a pH of 5-5.5 and a surface tension of 36.7 dynes/cm. U. S. Patent Nos. 2,184,770 and 2,236,541. Suggested Uses: Wetting and foaming agent used in tooth paste and tooth powder. Foamer and detergent for use in cosmetics and pharmaceuticals where soap may be indicated as undesirable. The Emulsol Corp.

HILO No. 916 NC BLACK CRYSTAL

Sprayed full body as received. Coated parts are placed into foul oven at a temperature not over 125°F. for one hour. The fouled atmosphere causes the pattern to form. The parts are then baked in a regularly ventilated oven at 250 to 300°F. for half an hour. Hilo Varnish Corp.

HILO BLACK RIP-PL "A"

Sprayed full body. A heavy coat is applied, coated parts allowed to air dry for 20 minutes then placed in oven at a temperature of 250°F. until Rip-pl pattern forms (20 to 30 minutes) and then baked at 300°F. for one hour. Hilo Varnish Corp.

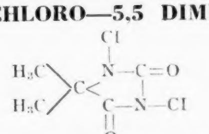
HYDRAZINE HYDRATE 100%
(Diamine Hydrate)

$H_2NNH_2H_2O$. Mol. wt., 50.06. Hydrazine, 64.01%; H_2O, 35.99%; N, 55.94%. Colorless, strongly alkaline, fuming, refractive liquid, with faint characteristic odor. Sp. gr., 1.03. Boils, 118-119°. Melts, —40°. Miscible with water; slightly soluble in alcohol; insoluble in chloroform, ether. Chemical Properties: Is a strong base and when hot attacks glass and rubber. Suggested Uses: Most powerful reducing agent known. It is a protoplasmic poison. Fairmount Chemical Co., Inc.

HYDROXY STEARIC ACID, SULFATED
(Nopco 2031)

$C_{17}H_{34}$ (OSO_3Na) COOH. Mol. wt., 402 approx. Brown colored liquid, soluble in water in all proportions. Suggested Uses: Dyeing assistant for textiles, wetting agent for facilitating wall paper removal, and for adhesive coating preparations. National Oil Products Co., Inc.

HYDANTOIN
1,3 DICHLORO—5,5 DIMETHYL



Mol. wt., 197.3. White, crystalline, solid, active chlorine compound containing a minimum of 66% available chlorine. Soluble in organic solvents, particularly chlorinated hydrocarbons; slightly soluble in water. Suggested Uses: Its p properties suggest its use as a dye developer in textiles, antiseptic preparations, soaps, and as a general chlorinating and oxidizing agent where solubility in organic solvents and inactive residue are important. Can be cast or melted into unusual shapes. E. I. du Pont de Nemours & Co., Inc.

IONAC A-293

Anion exchange resin, offered as vitreous straw-colored particles. Chemical Properties: Acts as an acid absorbent. All reactions of ion-exchange resins are reversible. Suggested Uses: Specific functions of the Ionac ion-exchange resins, used individually or in series, indicate their potential usefulness in problems of purification, reclamation of small percentages of valuable solutes, chemical reactions, in dilute solution, and separation of strong from weak acids. Principal use at present: Softening and demineralization of water. American Cyanamid & Chemical Corp.

IONAC C-284

Cation exchange resin, offered as vitreous black particles. Chemical Properties: Possesses the property of exchanging sodium or hydrogen for any dissolved cation. All reactions of ion-exchange resins are reversible. Suggested Uses: Specific functions of the Ionac ion-exchange resins, used individually or in series, indicate their potential usefulness in problems of purification, reclamation of small percentages of valuable solutes, chemical reactions in dilute solution, and separation of strong from weak acids. Principal use at present: Softening and demineralization of water. American Cyanamid & Chemical Corp.

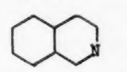
ISOCEL

An isomerization catalyst composed of activated bauxite impregnated with anhydrous aluminum chloride. $AlCl_3$ content, 15-20%. Bulk density, 65 lbs./cu. ft. Typical mesh sizes, 4/8, 4/14, and 6/14. Suggested Uses: As a catalyst for the vapor phase isomerization of hydrocarbons, e. g., butane to isobutane. Also known uses of $AlCl_3$ as a catalyst for alkylation, polymerization, Friedel-Crafts reactions. Available in any quantity desired. Attapulgus Clay Co., sales agents for Porocel Corp.

ISOPHTHALIC ACID

$C_6H_4(COOH)_2$. Mol. wt., 166.13. Needles. M. P., 345-7°C. Soluble in acetic acid, moderately soluble in alcohol, sparingly soluble in water, insoluble in benzene and ligroin. K_1,2.9 x 10^{-4} @ 25°C. K_2,2.5 x 10^{-6} @ 18°C. Chemical Reactions: Characteristic of aromatic organic acids. Owing to its dibasic character it forms both mono- and di-salts, esters, acid chlorides, amides, etc. Unlike phthalic acid it does not form an inner anhydride. Suggested Uses: In the synthesis of dyes, pharmaceuticals, and other organic chemicals. In synthetic resin manufacture. Available in limited quantities. National Aniline Div., Allied Chemical & Dye Corp.

ISOQUINOLINE



Purity, 95% min. Distillation range, 95% will distill within a range of 2°C. including the temperature of 243°C. Freezing point; 24°C. min. Solubility, sparingly soluble in cold water. Soluble in dilute mineral acids and in most common organic solvents, including alcohols, ethers, esters, ketones, aliphatic and aromatic hydrocarbons. Approx. wt. 1 gal. 9.15 lbs. Suggested Uses: Manufacture of pharmaceuticals, dies, insecticides, rubber accelerators, and in organic syntheses. Cont.—450-lb. returnable galvanized drums; 45-lb. cans. Reilly Tar & Chemical Corp.

ISOPROPANOLAMINE

$CH_3CH(OH)CH_2NH_2$. Mol. wt., 75.08. Sp. gr. at 20/20°C., 0.981. Boiling point, 160°C. at 760 mm. Solubility in water, complete. Moderately viscous liquid. Uses: In manufacture of pharmaceuticals, and emulsifying agents for polishes, textile specialties, leather compounds, insecticides, cutting oils, and water paints. Available only in "research" quantities. Carbide and Carbon Chemicals Corp.

JAPAN WAX SUBSTITUTE NO. 979

Suggested Uses: Its chemical and physical properties of this wax allow the replacing of genuine Japan wax in many formulas. Cornelius Products Co.

KERALIN ENZYME CONCENTRATE K

New proteolytic enzyme. Chemical Properties: Powerful, stable, wide pH range. Suggested Uses: In applications where hydrolysis of proteins is desired. American Cyanamid & Chemical Corp.

KERYL MERCAPTAN

Mixed alkyl mercaptan. Mercaptan prepared from kerosene and containing 11.5 to 12.5% mercaptan sulfur. Alkyl group averages about C_{13}. Pale yellow oil with a slight odor. Sp. gr., 0.857 @ 25°C. Insoluble in water, soluble in anhydrous alcohol and aromatic and aliphatic hydrocarbon solvents. Boiling range, approx. 75°C. to 180° C @ 5 mm. Chemical Properties: Exhibits usual mercaptan reactions such as oxidation to a disulfide, or with more vigorous oxidizing agents to oxygenated sulfur compounds; forms metallic mercaptides; forms thio ethers, and thio esters. Suggested Uses: As an intermediate for chemical synthesis where it is useful in introducing a long chain alkyl group. As a thio-alcohol in replacement for long chain oxygen alcohols. Available in limited commercial quantities. National Aniline Div., Allied Chemical & Dye Corp.

nn_1-DI (HYDROXYETHYL) LAURIC AMIDE
(Nopco 1179-C)

$C_{11}H_{23}CON$ $(C_2H_4OH)_2$. Mol. wt., 287. Light brown liquid, easily soluble in warm water. Soluble in oils, fats, and the common organic solvents. Suggested Uses: Emulsifier for mineral oils and pine oils. National Oil Products Co., Inc.

LAURYL CHLORIDE
(Dodecyl Chloride)

$C_{12}H_{25}Cl$ (approximate). Mol. wt., 213 (average). Sp. gr., 0.8618 @ 25°/15.5°C. Color, light yellow. Insoluble in water, soluble in organic solvents. Suggested Uses: Production of esters for plasticizers. Hooker Electrochemical Co.

LAURYL MERCAPTAN

$C_{12}H_{25}SH$ (approximate). Mol. wt., 211 (average). Sp. gr., 0.8420 @ 25°/15.5°C. Boiling range, 125 to 225° C. @ 15 mm. Color, water white. Insoluble in water, soluble in organic solvents. Suggested Uses: Catalyst in the production of copolymers such as Buna S. Hooker Electrochemical Co.

LEAD FLUOBORATE

Lead electroplating bath consisting of 42% sol. lead fluoborate, $Pb(BF_4)_2$, stabilized with excess of fluoboric (HBF_4) and boric (H_3BO_3) acids in balanced percentages. Suggested Uses: Any desired plating solution concentration is prepared by diluting with water. Permits lead plating directly on steel, giving smooth, nonporous, corrosion resistant surfaces to replace critical metals such as zinc, chromium, copper and nickel. Glass carboys up to 13 gal. Pennsylvania Salt Mfg. Co.

LEATHAFLEX No. 78

Alcohol sol. of plasticized protein resins. Dark brown color. Eight lbs/gal. On drying it produces a continuous flexible film that withstands rigorous bending. Bond strength increases on aging. Dried film can be softened by moderate heat. Suggested Uses: Solvent or heat sealing adhesive for paper, leather, textiles. Paisley Products, Inc.

LIGNOCELLULOSE

Mol. wt., lignin and cellulose complex. Sp. gr., 0.3. Hetergeneous material. Brown fiberous powder. Decomposes before melting. Partially soluble in oxygenated organic solvents; water insoluble. Suggested Uses: Semi-plastic filler for synthetic resins, thermoplastic polymers, and elastic polymers. Available in experimental quantities. Diamond Alkali Co.

LUCITE HEAT RESISTANT MOLDING POWDER

Characterized by marked heat resistance over general purpose Lucite molding powder or other acrylic powders. Developed to meet needs for a molded methyl methacrylate thermoplastic with inceased heat stability where a material of lower heat distortion point cannot be used. Mechanical, optical, electrical and molding properties of this new material are approximately the same as other formulations of Lucite. Suggested Uses: In existing compression injection and exclusion equipment. The yield temperature of articles molded may be 30 to 40°F. For flying light signal light lenses, electric switchboard color caps and railroad signal light lenses. Not recommended for articles subjected to boiling or temperatures over 200°F. E. I. du Pont de Nemours & Company, Inc.

LUPERCO AC

Stabilized catalyst compound containing an aromatic acyl peroxide and an organic filler. White crystalline powder containing 1.6% active oxygen. Suggested Uses: Catalyst for the polymerization of monomers such as methacrylates, vinyl esters, styrene, etc. The Lucidol Corp.

MAGNESIUM CHLORIDE

$MGCl_2.6H_2O$. White crystals. Hygroscopic. Sp. gr., 1.56. Melting point, 116.7. Typical analysis: $MGCl_2$, 46.0%; MgO, 0.01%; NaCl, 0.2%; $CaCl_2$, 0.05%; SO_4, 0.06%; Fe, 0.0002%; Mn, 1 p.p.m.; B, 2 p.p.m.; remainder H_2O. Suggested Uses: Production of magnesium metal, oxychloride cements, flooring compositions, metallurgical flux, chemicals, antifreeze compounds. Diamond Alkali Co.

MAGNESIUM FLUOSILICATE

$MgSiF_6.6H_2O$. Mol. wt., 274.48. Sp. gr., 1.788. White crystals. Very soluble in water. Chemical Properties: Acid salt. Reacts with alkalies to form alkali fluoride and silica. Grade: Technical. Suggested Uses: Hardening and waterproofing concrete, wood preservative. Available in commercial quantities. The American Agricultural Chemical Co.

MAGNESIUM METAPHOSPHATE

$Mg(PO_3)_2$. White crystalline powder. Insoluble in water. Non-hygroscopic. Suggested Uses: Mineral supplement for foods; constituent of glasses, glazes and porcelain enamels. Availability: Limited quantities available for experimental investigation. Monsanto Chemical Co.

MAGNESIUM OXIDE

White caustic calcined and yellow dead burned products of apparent density about 29 and 113 lbs. per cu. ft., respectively. Typical Analysis: SiO_2, 1.75%; R_2O_3, 1.75%; CaO, 2.0-3.0%; MgO, 93.5-94.5%. Suggested Uses: Refractory, flooring composition, paper manufacturing, oxychloride cements, chemicals, water purification. Petroleum purification. Available in experimental quantities. Diamond Alkali Co.

MAGNESIUM PYROPHOSPHATE

$Mg_2P_2O_7$. Mol. wt., 222.68. Appearance, white crystalline powder. Melting point, 1383°C. Insoluble in water; soluble in acids. Suggested Uses: In ceramic industry as constituent of porcelains and enamels. Available for experimental investigation. Monsanto Chemical Co.

MELANILINE OLEATE, S-697

Empirical formula, $C_{13}H_{13}N_3.C_{18}H_{34}O_2$. Mol. wt., 493.7. Consistency, viscous liquid. Color, amber. Sp. gr., 0.935 @ 25°C. Insoluble in water. Soluble in all common organic solvents, but only poorly soluble in mineral oil. Suggested Uses: Plasticizer for synthetic resins, synthetic waxes, etc. Glyco Products Co., Inc.

MENTHOL, Racemic

$C_{10}H_{20}O$. Mol. wt., 156.2. Colorless crystals. Congealing point, 28° (initial), gradually rising to 32°. Melting point, 34-36°. Boiling point, 216° @ 760 mm.; 75° @ 3 mm. Very slightly sol. in water. Sol. in organic solvents. Suggested Uses: For ointments and pharmaceutical preparations where U.S.P. grade is not required. Givaudan-Delawanna, Inc.

MERSIZE

50% Alkaline water solution of a resin containing three active carboxyl groups. Viscous liquid. Suggested Uses: Rosin plus Mersize is a more efficient paper engine sizing agent than rosin alone. Three carboxyl groups of Mersize make use of the high bond density points on a pulp fiber. Availability: Working quantities. Monsanto Chemical Co.

MERCAPTOBENZOTHIAZOLE, 97% PURE (Thiotax A)

Sp. gr., 1.42 @ 25°C. Melting point, above 175°C. Solubility, soluble in acetone, alcohol, benzene, chloroform and dilute caustic. Appearance, cream or light yellow powder. Suggested Uses: As an accelerator for crude and synthetic rubber. Available in commercial quantities. Monsanto Chemical Co.

METAL COATING 54-18B

Resin solution containing 40% solids dissolved in aromatic solvents. Applied over D1-22B primer. Suggested Uses: Deposits a film of high dielectric strength, good adhesion to metals, particularly iron and rusty surfaces. Film air-drys to a tough elastomeric coating. Has good resistance to water and bleaching agents but poor resistance to solvent systems. American Resinous Chemicals Corp.

METHIDE

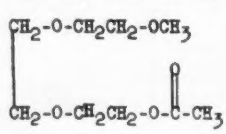
Synthetic organic chemical containing approx. 9% free stearic acid. Waxy in nature, with a white to gray color. Odor, slightly fatty acid. Melting point, approx. 135°C. Density, 0.99. Insoluble in water but easily dispersible for application. Suggested Uses: As a wax coating or impregnating material for paper, leather, textiles or wood where resistance to water and a range of solvents and chemicals is desired. Availability: Commercial quantities. Monsanto Chemical Co.

p-METHOXYBUTYROPHENONE

$CH_3CH_2CH_2COC_6H_4OCH_3$. Mol. wt., 178. Boiling point, 132-5° (5 mm.). Melting point, 17-19°. Yellow liquid. Suggested Uses: Organic syntheses. Available on order. Shipping Regulations: Chemicals, NOIBN. The Edwal Labs., Inc.

METHOXYTRIGLYCOL ACETATE

Mol. wt., 206.3. Sp. gr., 1.094 @ 20/20°C. B.P., 240°C. (760 mm.). Solubility in water, complete. Flash point, 260°F. Colorless. Low volatility. Suggested Uses: Has excellent solvent powers for cellulose esters and synthetic resins, and is therefore probably useful in protective coatings and printing inks. The absence of reactive groups and its non-hygroscopicity suggest its trial as an inert reaction medium and as an "anti-dusting" agent for finely powdered materials. Carbide and Carbon Chemicals Corp.



METHYL i-AMYL ACID PHOSPHATE

$(CH_3)(i\text{-}C_5H_{11})HPO_4$. Mol. wt., 182 (approx.). Sp. gr., 1.121 @ 25°C. Soluble in alcohol, acetone, ether, toluene. Amber liquid (technical grade). Chemical Properties: Forms salts with organic and inorganic bases. Available only in small quantities for experimental investigation. Victor Chemical Works.

METHYL n-BUTYL ACID PHOSPHATE

$(CH_3)(n\text{-}C_4H_9)HPO_4$. Mol. wt., 168 (approx.). Sp. gr., 1.161 @ 25°C. Soluble in alcohol, acetone, ether, toluene. Slightly colored liquid (technical grade). Chemical Properties: Forms salts with organic and inorganic bases. Available only in small quantities for experimental investigation. Victor Chemical Works.

METHYL "CARBITOL" ACETATE

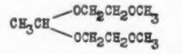
$CH_3COOC_2H_4OC_2H_4OCH_3$. Mol. wt., 162.18. Sp. gr. at 20/20°C., 1.0396. Vapor pressure, 0.1 mm. at 20°C. A colorless liquid, completely miscible with water. Uses: As a high-boiling (209.1° C.) solvent in cellulose ester lacquers and printing inks. Carbide and Carbon Chemicals Corp.

METHYL "CARBITOL" FORMAL

$CH_2(CH_3OCH_2CH_2OCH_2CH_2O)_2$. Mol. wt., 252.30. Sp. gr., 1.0402 @ 20/20°C. B.P., 305° C. (760 mm.). Vapor pressure, 0.01 mm. @ 20°C. Freezing point, -37.4°C. Solubility in water, complete. Flash point, 310°F. Suggested Uses: Has desirable properties as a resin plasticizer, especially at low temperatures and where low hydrocarbon solubility is desired: such as for fuel lines and tanks. Carbide and Carbon Chemicals Corp.

METHYL "CELLOSOLVE" ACETAL

Boiling point, 207.0°C. Sp. gr. at 20/20°C., 0.9762. Flash point, 205°F. Completely miscible with water. Uses: Source of nascent acetaldehyde. It has promising solvent properties under neutral or slightly alkaline conditions. Carbide and Carbon Chemicals Corp.



METHYL "CELLOSOLVE" LAURATE, S-791

Empirical formula, $C_{15}H_{30}O_3$. Mol. wt., 258.4. Consistency, fluid. Color, almost water white. Sp. gr., 0.900 @ 25°C. Sap. value, 200-207. Iod. value, 8 to 11. Volatility, 1.9% (4 hrs. @ 105°C.). Solidif. point, —6 to —12°C. Acidity, 0.1 mg. KOH/g max. Soluble in alcohols, ketones, esters, aromatic and aliphatic hydrocarbons. Insoluble in water. Compatible with nitrocellulose and ethyl cellulose. Suggested Uses: Plasticizer for nitrocellulose, ethyl cellulose, synthetic resins. Glyco Products Co., Inc.

METHYL "CELLOSOLVE" OLEATE, S-810

Empirical formula, $C_{21}H_{40}O_3$. Mol. wt., 340.5. Consistency, fluid. Color, (pale) amber. Sp. gr., 0.899 @ 25°C. Sap. value, 157-166. Iod. value, 70-80. Volatility, 0.34% (4 hrs. @ 105°C.). Solidif. point, —40 to —45°C. Acidity, 0.1 mg. KOH/g max. Soluble in alcohols, ketones, esters, aromatic and aliphatic hydrocarbons. Insoluble in water. Compatbile with nitrocellulose and ethyl cellulose. Suggested Uses: Plasticizer for nitrocellulose, ethyl cellulose, synthetic resins. Glyco Products Co., Inc.

METHYL "CELLOSOLVE" PHTHALATE, S-806

Empirical formula, $C_{21}H_{42}O_3$. Mol. wt., 282.3. Consistency, viscous fluid. Color, yellow. Sp. gr., 1.175 @ 25°C. Solidif. point, not frozen at —45°C. Volatility, 0.56% (4 hrs. @ 105°C.). Boiling point, 209-261°C. (20 mm.). Soluble in alcohols, ketones, esters, aromatic hydrocarbons. Insoluble in naphtha and water. Compatible with cellulose acetate, nitrocellulose, vinyl butyral polymer. Suggested Uses: Plasticizer, especially for cellulose acetate. Glyco Products Co., Inc.

METHYL "CELLOSOLVE" STEARATE, S-787

Empirical formula, $C_{21}H_{42}O_3$. Mol. wt., 342.5. Consistency, fluid. Color, almost water white. Sp. gr., 0.89 @ 25°C. Solidif. point, 20-21°C. Sap. value, 169-172. Iod. value, 6 max. Volatility, 0.24% (4 hrs. @ 105°C.). Acidity, 0.1 mg. KOH/g max. Soluble in alcohols, ketones, esters, aromatic and aliphatic hydrocarbons. Insoluble in water. Compatible with nitrocellulose and ethyl cellulose. Suggested Uses: Plasticizer for nitrocellulose, ethyl cellulose, synthetic resins. Glyco Products Co., Inc.

METHYL CYCLOHEXANE, Technical

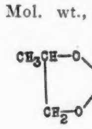
$CH_3.C_6H_{11}$. Mol. wt., 98.2. Colorless liquid with a characteristic odor. Boiling range, 5-95%, 100-103°C.; freezing point, less than —120°C.; sp. gr., 0.768 @ 25/25°C.; flash point, —5°C.; refractive index, 1.421 @ 25°C. Miscible at 25°C. with acetone, benzene, carbon tetrachloride and ether; soluble in methanol; insoluble in water. Suggested Use: Solvent. Shipping Regulations: Red label. The Dow Chemical Co.

METHYLDIETHANOLAMINE

$CH_3N(C_2H_4OH)_2$ Mol. wt., 119.16. Sp. gr., 1.043 at 20/20°C. Refractive Index, 1.4699. Boiling point (at 4 mm.), 121°C. Equivalent Weight, 119. Amine-odored, colorless liquid, miscible with water and benzene. Uses: Suggested as an intermediate in the manufacture of textile auxiliaries, insecticides, emulsifying agents, and corrosion inhibitors. Shows some evidence of selective action in the absorption of acidic gases. Carbide and Carbon Chemicals Corp.

4-METHYL DIOXOLANE

Mol. wt., 88.06. Sp. gr., 0.988 at 20/20°C. Boils at 85°C. 20 per cent soluble in water at 20°C. Colorless liquid. Uses: An extractant and solvent for oils, fats, waxes, dyestuffs, and cellulose derivatives, especially cellulose acetate. Available only in "research" quantities. Carbide and Carbon Chemicals Corp.



METHYL ETHYL ACID PHOSPHATE

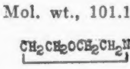
$(CH_3)(C_2H_5)HPO_4$. Mol. wt., 140 (approx.). Sp. gr., 1.281 @ 25°C. Soluble in water, alcohol, acetone, ether. Slightly colored liquid (technical grade). Chemical Properties: Forms salts with organic and inorganic bases. Available only in small quantities for experimental investigation. Victor Chemical Works.

METHYL LAURYL ACID PHOSPHATE

$(CH_3)(C_{12}H_{25})HPO_4$. Mol. wt., 280 (approx.). Sp. gr., 1.013 @ 25°C. Soluble in alcohol, acetone, ether, toluene, carbon tetrachloride, naphtha. Slightly colored liquid (technical grade). Chemical Properties: Forms salts with organic and inorganic bases. Suggested Uses: Wetting agent, emulsifier, oil additive. Available only in small quantities for experimental investigation. Victor Chemical Works.

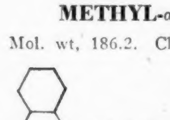
n-METHYLMORPHOLINE

Mol. wt., 101.15. Sp. gr., 0.916. Boiling point, 115.4°C. Completely miscible with water and benzene. Forms a constant boiling mixture which contains 25 per cent water and boils at 97°C. Uses: In the preparation of emulsifying agents for polishes benefited by the use of an emulsifier that becomes ineffective on drying. Available onlly in "research" quantities. Carbide and Carbon Chemicals Corp.



METHYL-α-Naphthyl Acetate

Mol. wt, 186.2. Clear, colorless, to pale straw-colored, practically odorless liquid. Boiling point, 184-186°C. at 10 mm. Hg; sp. gr., 1.141 at 25/25° C.; refractive index, 1.595 at 25°C. Completely miscible at 25°C. with acetone, benzene, carbon tetrachloride, ether and methanol; soluble in VMP Naphtha; insoluble in water. Suggested Use: Plant growth substance. The Dow Chemical Co.



METHYL OCTYL ACID PHOSPHATE

$(CH_3)(C_8H_{17})HPO_4$. Mol. wt., 224 (approx.). Sp. gr., 1.065 @ 25°C. Soluble in alcohol, acetone, ether, naphtha. Amber liquid (technical grade). Chemical Properties: Forms salts with organic and inorganic bases. Suggested Uses: Wetting agent, anti-foaming agent. Available only in small quantities for experimental investigation. Victor Chemical Works.

METHYL OLEYL ACID PHOSPHATE

$(CH_3)(C_{18}H_{35})HPO_4$. Mol. wt., 362 (approx.). Sp. gr., 0.980 @ 25°C. Soluble in alcohol, ether, acetone, toluene, carbon tetrachloride, naphtha. Colored liquid (technical grade). Chemical Properties: Forms salts with organic and inorganic bases. Suggested Uses: Emulsifier, oil additive. Available only in small quantities for experimental investigation. Victor Chemical Works.

METHYL PENTACHLOR STEARATE

$C_{17}H_{30}Cl_5COOCH_3$ (approximate). Mol. wt., 470.7 (approximate). Sp. gr., 1.200 @ 25.0/15.5°C. Insoluble in water; soluble in hydrocarbons. Color, clear yellow to deep reddish brown. Suggested Uses: Plasticizer for polyvinyl chloride films to impart flexibility at low temperature and to increase fire resistance; plasticizer for other film forming materials. Hooker Electrochemical Co.

2-METHYLPENTADIENE

C_6H_{10}. Mol. wt., 82.14. Sp. gr., 20°/20°C., 0.720. Density, lb./gal. at 20°C., 6.0. Refractive index, N_D^{20}, 1.4476. Freezing point, °C., below —75. Distillation range, °C. (95%). 74-76. Flash point, °C., below —40. Suggested Uses: Takes part in Diels-Alder reactions and it has many possibilities in co-polymerization reactions. Only experimental quantities are available. Commercial Solvents Corp.

2-METHYL-2,4-PENTANEDIOL

$CH_3C(CH_3)OHCH_2CH_2OHCH_3$. Mol. wt., 118.17. Sp. gr., 20°/20°C., 0.922. Distillation range, °C., 192-199. Flash point, °F., 201. Suggested Uses: Coupling agent in making single phase mixtures of water, petroleum naphtha, coal-tar hydrocarbons, castor oil, and the common organic ketones and esters. It also serves as a stabilizing agent in various types of emulsions. It has mild humectant properties over a range of humidity which indicate applications in the paper and textile industry. Commercial Solvents Corp.

METHYLPHLOROGLUCINOL (2,4,6-Trihydroxytoluene)

$C_7H_5(OH)_3$. Mol. wt., 140.13. Tan to white crystals, very soluble in hot and cold water, ether, alcohol, etc. Chemical Properties: An extremely reactive trihydric phenol entering into a wide variety of coupling and condensation reactions. Suggested Uses: Because of its high reactivity, methylphloroglucinol is of interest as a plastic raw material, as a coupling component in the manufacture of azo dyestuffs, and as an intermediate in organic synthesis. The substance shows antioxidant properties in certain materials. Available on order in any quantity for essential war uses. Shipping Regulations: Chemicals, NOIBN. The Edwal Labs., Inc.

METHYL PHOSPHORIC ACID

Liquid 97% acid. Color, amber on standing. Sp. gr., 1.439. Wt. per gal., 12.4 lbs. Suggested Uses: As catalyst in reaction such as urea aldehyde molding compounds and as rust and corrosion inhibitor. Availability: For government contracts or upon allocation. Monsanto Chemical Co.

METHYL RICINOLEATE (Nopco 1060-C)

$C_{17}H_{32}$ (OH) $COOCH_3$. Mol. wt., 312. Light brown liquid. Insoluble in water. Soluble in vegetable and animal fats and in common organic solvents. Suggested Uses: Vehicle for pigments in inks, lubricant for textiles, paper and other fibrous articles. National Oil Products Co., Inc.

METHYL STEARYL ACID PHOSPHATE

$(CH_3)(C_{18}H_{37})HPO_4$. Mol. wt., 364 (approx.). Sp. gr., 0.910 @ 90°C. Melting point, 58-59°C. Soluble in acetone, ether, toluene, carbon tetrachloride, naphtha. Waxy solid (technical grade). Chemical Properties: Forms salts with organic and inorganic bases. Suggested Uses: Emulsifier, oil additive. Available only in small quantities for experimental investigation. Victor Chemical Works.

MODINAL DN PASTE

Fatty alcohol sulfate used as a synthetic detergent for textiles. Gardinol Corp. (E. I. du Pont de Nemours & Co., Inc.)

MONOETHANOLAMINE

$HO.CH_2.CH_2NH_2$. Mol. wt., 61.1. Pale straw-colored liquid with an ammoniacal odor. Boiling range, 5-95%, 169.5-171.5°C. Sp. gr., 1.015 at 25/25°C. Miscible in all proportions at 25°C. with acetone, methanol, water; slightly soluble in benzene, ether, VMP Naphtha; insoluble in carbon tetrachloride. Chemically active organic base. Suggested Uses: In gas purification and in the form of fatty acid soaps as detergent, wetting agent and similar applications. The Dow Chemical Co.

MONO-METHYL AZELATE (Plasticizer V-148)

Consists principally of mono-methyl azelate, $CH_3OOC(CH_2)_7COOH$. Sp. gr., 1.0463 @ 25°/25°C. Semi-solid at room temperature. Distillation range (50 mm.), up to 160° C., 3.0% over, 160°-200°C., 25% over, 200°-220°C., 19% over, 220°-230°C., 26% over, 230°-240°C., 4% over, above 240°C., 23% over. Solubility, partly soluble in water, soluble alcohol and ether. Color, amber. Odor, sweet. Chemical Properties: Stable to heat and light. Suggested Uses; As plasticizer for zein. Good compatibility, elongation and tensile strength, low H_2O absorption. Suitable for use in plastic compositions and alcoholic zein solutions for shellac substitutes. Available in limited commercial quantities. Cont., 50 gal. wood barrels. Emery Industries, Inc.

MONTY WAX No. 3

Very hard, waxlike material. Compatible with most other waxes and thermoplastic resins. Dark brown in color. Melting point (mercury method), 154°F. Pen. needle (ASTM) 100 gr./5 sec./-11°F., 5. Iodine value, 18-19. Saponification value, 47-49. Acetyl value, 44-46. Suggested Use: Alternate for montan wax. Wishnick-Tumpeer, Inc.

NACCONOL HG

Alkyl aryl sulfonate. Similar to Nacconol NR, NRSF, etc. Organic content 55%. Light cream-colored flakes. Suggested Uses: Surface active agent with good stability in acid and alkaline solutions. Used in combination with soap for salt-water all-purpose soaps. Available under priority restrictions. National Aniline Div., Allied Chemical & Dye Corp.

NEOPRENE DISPERSION 186-22

Processed neoprene latex dispersion containing 40% solids. Suggested Uses: Yields films of high tensile strength exhibiting good water and oil resistance. For use in adhesive coating and impregnating applications. American Resinous Chemicals Corp.

NEUTRONYX

Amber colored oily liquid. Miscible with water and most organic solvents. Stable in the presence of acids, alkalis, salts, anionic and cationic surface active agents. Suggested Uses: Detergent and emulsifying agent. Available in anhydrous form and in aqueous solution in commercial quantities. Onyx Oil & Chemical Co.

NITRIC ACID, RED FUMING

Light red liquid containing up to 20% NO_2 by weight; remainder 96% HNO_3. Sp. gr., 155-158; B.P., 130-140°F depending on NO_2 content. Suggested Uses: Good oxidizing agent. E. I. du Pont de Nemours Company, Inc.

NONAETHYLENE GLYCOL MONOOLEATE, S-725

Empirical formula, $C_{36}H_{70}O_{11}$. Mol. wt., 678.56. Consistency, fluid. Color, dark amber. Sp. gr., 1.050 @ 25°C. Soluble in alcohols, ketones, esters, aromatic hydrocarbons. Limited compatibility with naphtha, mineral oil, vegetable oil. Soluble in water with a pH of 5. Suggested Uses: Emulsifier, surface active agent. Glyco Products Co., Inc.

NON-IONIC LD

100% active fatty hydrophillic water dispersible colloid. Deep amber oil with a faint pleasant odor. Good dispersion in water. 1% dispersion has a pH of 7.5 and a surface tension of 29.8 dynes/cm. Wetting time of a 0.1% active ingredient, 13 sec. (Draves test.) Suggested Uses: Good non-ionic wetting, dispersing and detergent agent for cosmetics and pharmaceuticals. Stabilizes acid cosmetic creams. U. S. Patent Pending. The Emulsol Corp.

NON-IONIC LG

Edible grade and purified fatty hydrophillic colloid. White crystalline or white solid hard wax. Odorless. Disperses easily in warm water and remains as an opalescent dispersion on cooling. A 1% dispersion has a pH of 7.0 and a surface tension of 27.5 dynes/cm. Wetting time of a 0.1% conc., 45 sec. (Draves tests). Free fatty acid, expressed as oleic acid, 0.1% to 0.2%. (Contains no soap.) Non-toxic. Suggested Uses: Edible non-ionic wetting and emulsifying agent for pharmaceuticals, food and cosmetic emulsions. Detergent. The Emulsol Corp.

NON-IONIC OD

100% fatty hydrophillic water dispersible colloid. Deep amber oil with a faint odor. Good dispersion in water. 1% dispersion has a pH of 7, and a surface tension of 30.0 dynes/cm. Wetting time of a 0.1% active ingredient was 18 seconds (Draves test). Suggested Uses: Good non-ionic wetting, dispersing and detergent agent for cosmetics and pharmaceuticals. For emulsifying waxes. Stabilizes acid cosmetic creams. U. S. Patent Pending. The Emulsol Corp.

NYLON BRISTLES, TAPERED

Made with the required taper. Have resilience, toughness, length and intertness to paint ingredients. Suggested Uses: Ready for placement in paint brushes without further treatment or conditioning by the brush manufacturer. Produced mechanically in desired lengths and tapers. Moth-proof, non-deteriorating in storage, it is claimed that these bristles will not dry out or rot. Production today is exclusively for U. S. Navy, but after the war is expected to be made available generally. E. I. du Pont de Nemours & Company, Inc.

NYLON MOLDING POWDER FM-1

An injection molding composition of nylon which possesses extreme toughness and high softening temperature. Color: translucent light amber. Extremely slow burning and practically unaffected by age. Can be injected in thin sections and made to flow around complicated inserts. Its high service temperature under load, approximately 275°F., is said to exceed those of other molded thermoplastics. Density, 1.14 grams per cc. Production under allocation by WPB; small quantities available for experimentation. E. I. du Pont de Nemours & Company, Inc.

NYLON TWILL FABRIC (Coated)

Suggested Uses: For mountain tent material, made according to Philadelphia Quartermaster Depot Specification 257A. E. I. du Pont de Nemours & Company, Inc.

OIL 202

Oxidizing oil of terpenic origin. With addition of customary driers, it dries at about the same rate as linseed to a hard, rather brittle film. Will not polymerize further with heat. Viscosity (G.H.), V-Y. Acid value, 17-23. Color (G.H. 1933), 13-15. Iodine value (Wijs), 125-145. Wt./gal., 8.10-8.30. Suggested Uses: As critical oil extender in various protective and decorative coatings and in printing inks; also as vehicle binder in emulsion paints and in high heat-resistant coatings. Stroock & Wittenberg.

ORANAP POWDER

A sodium higher alkyl naphthalene sulphinate. A light powder soluble in water. Suggested Use: As a wetting agent for neutral, acid and alkaline baths. Jacques Wolf & Co.

ORATOL L-48

A sulphonated aliphatic amide. Suggested Uses: A water soluble paste used as a penetrator, emulsifier, and dispersing agent for textile and leather processes. Jacques Wolf & Co.

ONYX B. T. C.

Mixture of higher molecular alkyldimethylbenzyl ammonium chlorides, main ingredient being $(CH_3)_2(C_6H_5CH_2).C_{12}H_{25}.NCl$. Powerful disinfectant, germicide, fungicide. Soluble in water and most organic solvents. Available in aqueous solution in strengths up to 50%. Slightly yellowish to colorless. Chemical Properties: Strongly surface active, foaming, wetting. Stable at boiling. Surface tension of 0.03% sol. at 30°C., 35 dynes/cm. Stable in presence of acids, alkali, and salts. Substantive to wool, cotton and rayon. Renders textiles resistant against bacteria, mildew, moth. At the present time available only on high priority ratings. Onyx Oil & Chemical Company.

PAPER RESIN 607

Spray dried melamine formaldehyde resin. Chemical Properties: Can be prepared as a positively charged colloid. Suggested Uses: In colloidal condition the resin may be added to dilute paper stock at any point in the paper making process prior to the sheet formation, and be retained by these fibers. The resulting paper has a good degree of wet strength, and the dry strength properties of the treated paper, particularly the folding endurance, are increased. American Cyanamid & Chemical Corp.

PARAFFIN, CHLORINATED (Resinous, Chlorowax)

Typical Properties: Chlorine content, 69-73%; Sp. gr., 1.64; Color, light; Melting point, (Ball & Ring), 90°C. (min.). Highly chlorinated paraffin wax in the form of a pulverized water insoluble resin. No oxidation on exposure to air, no condensation or polymerization on drying. Starts to decompose below the ignition temperature of many combustible materials by evolving hydrogen chloride. If a substantial quantity of precipitated calcium carbonate is present when the Chlorowax starts to decompose, the evolution of hydrogen chloride gas is restrained by chemical reaction with the calcium carbonate. More stable to decomposition than paraffins of lower chlorine content. In blending Chlorowax with other ingredients, care should be taken not to exceed a temperature of 130°C. Suggested Uses: Flame retardant for protective coatings. Experimental quantities available to established manufacturers. Diamond Alkali Co.

PARAFFIN, HIGHLY CHLORINATED

Light colored, almost white, brittle resin, softening at about 100°C. and remaining very viscous at 140°C. Contains 76 to 78% chlorine. This product is more stable than other chlorinated paraffins containing lesser amounts of chlorine. Suggested Uses: Resin for paints to withstand severe weather conditions. Hooker Electrochemical Co.

PELARGONYL CHLORIDE

$CH_3(CH_2)_7COCl$. Mol. wt. 176.5. Sp. gr., 0.995 @ 20°/15.5°C. Boiling range, 80-115°C. @ 25 mm., 170-220°C. @ 760 mm. Color, colorless to light yellow. Is hydrolyzed by water; reacts with alcohols to produce esters, soluble in ether. Suggested Uses: Intermediate to produce esters for plasticizers; to produce the peroxide for polymerization catalyst. Hooker Electrochemical Co.

PENSAL-B

Compounded mixture of buffered alkalis with a hydrophilic colloid, augmented by wetting agents. Suggested Use: Laundry detergent which can be used on all classifications; family work, damp wash, colored work, overalls, wiping rags. Shipped in 100 lb. Osnaburg bags. Pennsylvania Salt Mfg. Co.

PENTACIZER 317

Technical grade of pentaerythritol triacetate mono stearate. Compatible with cellulose derivatives and most synthetic resins to the extent of several percent. Suggested Uses: When compounded in molding compositions serves as a nonclouding lubricant. Increases flow rates in injection and extrusion molding and serves as a stripping agent for films. Heyden Chemical Corp.

PENTACIZER 344

A pentaerythritol derivative. Suggested Uses: Has the property of tackifying synthetic rubbers including GRS. The addition of less than 5% improves ease of milling and break-down time. Does not significantly effect the curing time or the physical properties of the cured rubber. Heyden Chemical Corp.

PENTACIZER 364

A pentaerythritol ester, soluble in water and alcohols which is supplied as 85% acqueous solution. Hygroscopic. Suggested Uses: As a glycerol substitute, for instance as a paper softener where it also imparts grease resistance. Heyden Chemical Corp.

PENTAWAX 286

An ester of a pentaerythritol type alcohol which has a softening point of about 120°C. Forms gels at approximately 5% solids concentration in aliphatic hydrocarbon solvents, thus simulating the hitherto unique property of carnauba wax. Suggested Uses: In formulating paste wax polishes and in compositions melting above the boiling point of water. Heyden Chemical Corp.

PERMEX

Dehydrogenated rosin prepared to develop very low oxygen pickup. Melting point, 80°C. Color, X to WG (Rosin scale). Specific rotation, + 40-50°. Acid number, 160 (approx.) Chemical Properties: A high molecular-weight resin acid of aromatic type consisting primarily of dehydro-, dihydro-, and tetrahydroabietic acid; stable to oxidation; soluble in wide variety of aliphatic and aromatic solvents. Suggested Uses: Wherever a stabilized rosin is indicated. Hercules Powder Co.

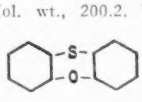
PEROXIDE RH-2

Stable, aromatic organic peroxide. White crystalline solid. M.P. 200-240°C. Active oxygen 6.5%. Insoluble in water and cold methyl alcohol. Soluble in acetone, chloroform, benzene, dioxane, etc. Suggested Uses: Suitable as catalyst for polymerization of monomers at temperatures above 100°C. The Lucidol Corp.

PETROLEUM CATALYST

White powdery petroleum catalyst produced by Diakel Corp. Free flowing and highly adsorptive, non-hygroscopic. For U. S. Government distribution for the duration of World War II. Diamond Alkali Co.

PHENOTHIOXIN



Mol. wt., 200.2. White crystalline solid with a faint pleasant odor. Boiling point, 180°C. at 10 mm. Hg; sp. gr., 1.226 at 60/25°C.; melting point, 53-55°C. Solubility in grams per 100 grams solvent at 25°C.: Acetone—200, benzene—165, carbon tetrachloride—100, ether—165, methanol—7, VMP Naphtha—35, water—insoluble. Suggested Use: As an insecticide. The Dow Chemical Co.

o-PHENYLENEDIAMINE (1,2-Diaminobenzene) Improved Photo Grade

$C_6H_4(NH_2)_2$. Mol. wt., 108.14. Melting point 101-2°. Ash less than .3%. Yellowish white crystals, soluble in water, alcohol, ether. Suggested Uses: Photographic developer (non-staining), organic synthesis. Available from stock. Shipping Regulations: Chemicals, NOIBN. The Edwal Labs., Inc.

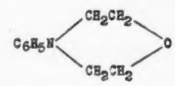
PHENYL MERCURIC GLUCONATE

$CH_2OH(CHOH)_4COOHgC_6H_5$. Mol. wt., 472.8. Melting point, 167-171°C. Solubility in water, 4 parts per thousand at room temp. White, odorless crystalline solid. Suggested Uses. Anti-infective. Available in small quantities for investigational uses. F. W. Berk and Co., Inc.

PHENYL MERCURIC HYDROXIDE

C_6H_5HgOH. Mol. wt., 294.7. Melting point, decomposes 200°C. Solubility in water, 2 parts per hundred at room temperature. White, odorless powder. Chemical Properties: Strong base, forming salts of low solubility with most acids. Suggested Uses: As a commercial bacteriostat, fungustat and mycotic agent of general application. Available in commercial quantities. F. W. Berk and Co., Inc.

n-PHENYL MORPHOLINE



Mol. wt., 163.11. One per cent soluble in water at 20°C. Melts at 52-56°C. and boils at 265-268°C. Vapor pressure is less than 0.1 mm. at 20°C. White solid. Uses: A chemical intermediate in the manufacture of dyestuffs, rubber accelerators, corrosion inhibitors, and photographic developers. Avaliable only in "research" quantities. Carbide and Carbon Chemicals Corp.

PHENYL PHOSPHINIC ACID

$C_6H_5PHO(OH)$ or $C_6H_5P(OH)_2$. Mol. wt., 142. Melting point, 70°C. Soluble in water, alcohol. Slightly soluble in ether. White crystals. Stable in air. Has phosphine odor. Chemical Properties: Monobasic acid. Forms inorganic salts. Trivalent phosphorus oxidizes to phenyl phosphonic acid with ordinary oxidation agent. Suggested Uses: Anti-oxidant. Improves fastness of dyed cellulose to light. Soap preservative. Available only in small quantities for experimental investigation. Victor Chemical Works.

PHENYL PHOSPHONIC ACID

$C_6H_5PO(OH)_2$. Mol. wt., 158. Sp. gr., 1.475 @ 4°C. Melting point, 158°C. Soluble in alcohol, ether, water. Insoluble in benzene. White crystals. Stable in air. Chemical Properties: Dibasic acid. Forms inorganic salts. Suggested Uses: Intermediate for its metallic salts. Additive to molasses to retard development of color. Anti-static agent in spinning. Lubricating oil additive. Improves fastness of dyed cellulose to light. Available only in small quantities for experimental investigation. Victor Chemical Works.

PHENYL PHOSPHORUS DICHLORIDE (Phosphenyl Chloride)

$C_6H_5PCl_2$. Mol. wt., 179. Sp. gr., 1.319 @ 20°C. Boiling point, 224.6°C. Colorless liquid. Mixes in every proportion with common inert organic solvents. Decomposes in water, fumes in air. Very slowly decomposes in light. Chemical Properties: Hydrolyzes in water to form phenyl phosphinic acid. Two reactive chlorine atoms capable of reaction with alcohol, phenols, amines, aldehydes. Adds oxygen, sulfur and halogens. Suggested Uses: Intermediate for organic synthesis. Preparation of derivatives of phenyl phosphinic acid. Available only in small quantities for experimental investigation. Victor Chemical Works.

PHENYL PHOSPHORUS OXYDICHLORIDE

$C_6H_5POCl_2$. Mol. wt., 195. Sp. gr., 1.375 @ 20°C. Boiling point, 258°C. Soluble in carbon tetrachloride, benzene, chloroform. Decomposes in water. Colorless liquid. Chemical Properties: Two reactive chlorine atoms capable of reacting with alcohol, phenols, and amines. Hydrolyzes in water to form phenyl phosphonic acid. Suggested Uses: Intermediate for organic synthesis. Available only in small quantities for experimental investigation. Victor Chemical Works.

PHENYL PHOSPHORUS THIODICHLORIDE

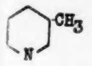
$C_6H_5PSCl_2$. Mol. wt., 211. Sp. gr., 1.376 @ 13°C. Boiling point, 205°C. (130 mm.). Colorless liquid. Decomposes in water. Smokes slightly in air. Chemical Properties: Two reactive chlorine atoms. Decomposes slowly in water. Reacts with alcohol, phenols, amines to form the corresponding neutral esters and amides. Suggested Uses: Intermediate for organic synthesis. Lubricating oil additive. Available in small quantities for experimental investigation. Victor Chemical Works.

PHOSPHORUS PENTASULPHIDE

P_2S_5. Mol. wt., 222.34. Sp. gr., 2.03. Melting point, 276°C. Boiling point, 514°C. Color, yellowish gray. Form, lump. Chemical Properties: Reacts with organic chemicals to form sulfur compounds. Decomposed by water. Soluble in alkalies, alcohol, ether, CS_2, and benzene. Grade: Technical. Shipping regulations: Yellow label. Suggested Uses: In organic synthesis. Available in commercial quantities. The American Agricultural Chemical Co.

β PICOLINE

Purity, 90% min. Distillation range, 95% shall distill within a range of 2.0°C., including the temperature of 144.2°C. Solubility: Very soluble in water. Soluble in most common organic solvents including alcohols, ethers, esters, ketones, aliphatic and aromatic hydrocarbons. Approx. wt. 1 gal., 8.01-lbs. Suggested Uses: Pharmaceuticals, resins, dyestuffs, rubber accelerators, insecticides. Cont., 400-lb. returnable galvanized drums; 40-lb. cans. Reilly Tar & Chemical Corp.



γ PICOLINE

Purity, 95% min. Distillation range, 95% shall distill within a range of 2°C. including the temperature of 145.4°C. Freezing point, 1.5°C. min. Approx. wt./gal., 8.01 lbs. Solubility: Very soluble in water, soluble in most common organic solvents including alcohols, ethers, esters, ketones, aliphatic and aromatic hydrocarbons. Suggested Uses: Pharmaceuticals, resins, dyestuffs, rubber accelerators, insecticides.—400-lb. returnable galvanized drums; 40-lb. cans. Reilly Tar & Chemical Corp.

PIPERAZINE HEXAHYDRATE

$HNCH_2CH_2NHCH_2CH_26H_2O$. Mol. wt., 194. Melting point, 40°. White deliquesent crystals. Chemical Properties: Hygroscopic, sensitive to light. Suggested Uses: Preparation of piperazine salts, pharmaceuticals. Available from stock. Shipping regulations: Chemicals, NOIBN. The Edwal Labs., Inc.

PLASTIC SULFUR

Melting point, indefinite. Solubility, min. 50% insoluble in carbon bisulfide. Appearance, greenish yellow. Suggested Uses: As a compounding ingredient in rubber. Available in commercial quantities. Monsanto Chemical Co.

PLYWOOD GLUE S-273

Liquid thermosetting plywood glue (80% solids in ethyl alcohol) viscosity, 8-12 poises; pH, 7.80-8.00. Sp. gr., 1.16. Suggested Uses: Manufacture of aeronautical, marine and general purpose plywood veneers which meet specifications AN-G-8 and AN-NN-P-511b. In combination with Accelerator S-288 this glue requires pressure of 50#/sq. in., temperature of 250°F. and curing time of 7 minutes. Stroock & Wittenberg.

POLYCHLORPROPANE, Liquid

$C_3H_2Cl_6$ and C_3HCl_7. Mol. wt., 268.3 (average). Boiling range, 185° to 250°C. Sp. gr., 1.70 to 1.75 @ 25°/15.5°C. Color, water white. Insoluble in water, miscible with alcohol, ether and chlorinated solvents. Viscous liquid at temperatures below −50°C. Suggested Uses: Plasticizer, paint softener, insecticide, rubber and plastic modifier. Hooker Electrochemical Co.

POLYETHYLENE GLYCOL 600, 900

$HO(CH_2CH_2O)xH$. Mixtures of various higher glycols which are rather viscous, light-colored, hygroscopic and melt at about room temperatures. Absorb less moisture when exposed to the atmosphere than the simpler glycols. Polyethylene Glycol 600 has an average molecular weight of approximately 600; Polyethylene Glycol 900 has a molecular weight of approximately 900. Suggested Uses: Solvents for nitrocellulose, a property which would be expected from the combination of alcohol and ether groups. Also, as plasticizers for casein and gelatin compositions, glues, cork, polyvinyl alcohol, and special printing inks, where advantage can be taken of their low vapor pressures and decreased hygroscopicities. The two alcohol groups present in the molecule can be esterified with dibasic acids to form resins of the alkyd type which possess different and unusual properties. When esterfied with only one molecule of fatty acid they form good emulsifying agents and detergents. Carbide and Carbon Chemicals Corp.

POLYVINYL ACETATE EMULSIONS

Properties can be modified by adding plasticizers and other materials. The emulsions are stabilized dispersions of high and low viscosity polyvinyl acetate resin in water. They can be used without flammable solvents. Suggested Uses: Adhesives for bonding a variety of materials. In some applications polyvinyl acetate emulsions can be used for replacement of rubber latex emulsions. E. I. du Pont de Nemours & Company, Inc.

POROCEL DESICCANT

Drying adsorbent prepared from activated bauxite. Bulk density, 55-58 lbs./cu. ft. Specific heat, about 0.24 cal. per g. Typical mesh sizes, 4/8, 4/14, 10/20. Absorbs from 8% to 12% of its weight of water, depending on conditions, before moisture is detectable in the effluent. The total water adsorption capacity is about 22%. Suggested Uses: Desiccant for dehydrating both liquids and gases to low dew points at ordinary and high pressures. The adsorbent can be regenerated repeatedly by heating at 300°-500°F. For drying gaseous and liquid charges to various hydrocarbon conversion processes, *e.g.*, isomerization, alkylation (HF), the dehumidifying of natural gas to prevent hydrate formation, the protection of anhydrous organic chemicals from moisture, and the drying of various gases. Also used for anhydrous packaging of metal parts, dehydrated foods and instruments. Available in any quantity desired. Attapulgus Clay Co., sales agents for Porocel Corp.

POTASSIUM METAPHOSPHATE

KPO_3. White powder. Practically insoluble in water. Insoluble in alcohol. Non-hygroscopic. Melting point, approximately 810°C. Reactivity: With concentrated solutions of NaCl, an exchange of Na and K ions takes place with the formation of complex sodium-potassium metaphosphates. These complex metaphosphates are water soluble and form viscous aqueous solutions. Suggested Uses: Ceramic glazes; phosphate glasses; water insoluble polishing agent. Availability: Samples are available for experimental investigation. Monsanto Chemical Co.

POTASSIUM SILICATE (Kasil No. 2)

32° Baumé. Mol. ratio, 1:3.92. 8.85% K_2O, 22.1% SiO_2. Specially concentrated. Suggested Uses: Binder in welding rods, paints and non-blooming films. Philadelphia Quartz Co.

POTASSIUM SILICATE (Kasil No. 6)

40.75° Baumé. Mol. ratio, 1:3.29. 12.10% K_2O, 26.8% SiO_2. Suggested Uses: Binder in welding rod coatings. Philadelphia Quartz Co.

PROPYLENE GLYCOL

$CH_3CHOH.CH_2OH$. Mol. wt., 76.1. Clear, colorless liquid. Boiling range, 5-95%, 185-190°C.; sp. gr., 1.035-1.037 at 25/25°C.; refractive index, 1.430-1.431 at 25°C.; acidity as acetic acid, 0.01% max.; water, 1% max.; color (APHA), 15 max. Miscible in all proportions with acetone, methanol, ether and water; insoluble in carbon tetrachloride and VMP Naphtha; practically insoluble in benzene. Suggested Uses: As a solvent in the food flavorings, pharmaceutical and cosmetic industries and, in general, as a substitute for alcohol and glycerol. It is a plasticizer for cork products. Like ethylene glycol, it is used as an antifreeze and humectant. Also of interest as a sterilizing agent in air conditioning and an ingredient of brake fluids. The Dow Chemical Co.

PROPYLENE GLYCOL BORATE, S-785

A complex propylene glycol borate. Consistency, viscous fluid. Color, water white to pale straw. Soluble in water. Insoluble in most organic solvents, pH of 10% aqueous solution, 7.85, of 50% acqueous solution, 6.80. Suggested Uses: water-soluble resin, humectant, plasticizer, glycerine substitute. Glyco Products Co., Inc.

PROPYLENE GLYCOL POLYRICINOLEATE, S-799

A propylene glycol ester of polymerized castor oil fatty acids. Consistency, fluid. Color, amber. Sp. gr., 0.93 @ 25°C. Soluble in alcohols (limited only in methanol) aromatic and aliphatic hydrocarbons, mineral oil. Dispersible in water. pH of 5% aqueous dispersion, 9.2. Suggested Uses: Emulsifier. Glyco Products Co., Inc.

PROPYLENE GLYCOL POLYRICINOLEATE, S-800

A propylene glycol ester of polymerized castor oil fatty acids. Consistency, fluid. Color, amber. Sp. gr., 0.932 @ 25°C. Solidif. point, −45 to −50°C. Soluble in alcohols, ketones, esters, aromatic and aliphatic hydrocarbons, not dispersible in water. Limited solubility in methanol. Suggested Uses: Low temperature plasticizer for synthetic waxes, synthetic resins, etc. Glyco Products Co., Inc.

PROPYLENE GLYCOL POLYRICINOLEATE, S-801

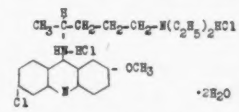
A propylene glycol ester of polymerized castor oil fatty acids. Consistency, fluid. Color, amber. Sp. gr., 0.93 @ 25°C. Soluble in alcohols, (limited only in methanol) aromatic and aliphatic hydrocarbons, mineral oil. Dispersible in water. pH of 5% aqueous dispersion, 10.2. Suggested Uses: Emulsifier. Glyco Products Co., Inc.

PROPYL GALLATE

White, crystalline solid. Slightly soluble in vegetable oils and animal fats. Suggested Use: Anti-oxidant to prevent the development of rancidity. Heyden Chemical Corp.

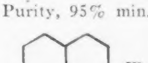
QUINACRINE

Dihydrochloride of 2-methoxy 6-chloro-9 (α diethylamino Δ pentylamino) acridine. Mol. wt., (anhydrous) 399.5 + 2HCl = 472.5. Yellow crystalline material. Soluble in water, insoluble in most organic solvents. Forms an insoluble compound with sodium dichromate. Suggested Use: Antimalarial, substitute for quinine. Production under Government control. National Aniline Div., Allied Chemical & Dye Corp.



QUINALDINE

Purity, 95% min. Distillation range, 95% shall distill within a range of 2° C. including the temperature of 247.7°C. Solubility: Sparingly soluble in cold water. Soluble in dilute mineral acids and in most common organic solvents, including alcohols, ethers, esters, ketones, aliphatic and aromatic hydrocarbons. Approx. wt./gal., 8.82 lbs. Suggested Uses: Manufacture of pharmaceuticals, dyes, insecticides, rubber accelerators, and in organic syntheses. Cont.—450-lb. returnable galvanized drums; 45-lb. cans. Reilly Tar & Chemical Corp.



RESIN EMULSION NO. 3050

Latex or reclaim rubber extender and coating compound. Dried film has good water resistence. Suggested Uses: Sizings, coatings, binder for paper, cloth, wood, leather. Paisley Products, Inc.

RESINOX 200

Plywood adhesive. Supplied as a water soluble powder. Is a medium temperature-curing phenolic adhesive. Suggested Use: For bonding Douglas fir plywood. Approved by the Douglas Fir Plywood Association for exterior grade plywood. Special advantage of this material is its fast curing cycle. Availability: Subject to allocation control by the Chemical Division of War Production Board. Monsanto Chemical Co.

RESINOX 800

Dielectric material with high arc resistance. It can be readily molded around inserts. Machinability is fair. Suggested Uses: For engine ignition parts such as magneto housings and rotors, relay housings and connectors, and other parts requiring high performance dielectric material. Availability: Subject to allocation control by Chemical Division of War Production Board. Monsanto Chemical Co.

RESINOX 801

A powdered melamine resin soluble in water to form solutions as low as 35% solids. More dilute solutions may be formed by using mixtures of alcohol and water. Suggested Uses: A resin for the production of impregnated and laminated structures and parts. Availability: Subject to allocation control by Chemicals Division of War Production Board. Monsanto Chemical Co.

RESINOX 803

A cellulose filled, melamine molding material with an improved cure time permitting faster production cycles. Has good dielectric strength and arc resistance. This material can be molded around inserts, possesses good impact strength and can be tapped or machined easily. Suggested Uses: For connectors, switch and relay housings and for other electrical insulation uses where a non-tracking material is desired. Availability: Subject to allocation control by Chemicals Division of War Production Board. Monsanto Chemical Co.

RESINOX 840

A melamine plywood resin. Suggested Uses: For the lamination of plywood and the laminating and impregnating of paper and fibre for the production of high-strength parts. Low curing temperatures and fast cycles of cure are advantages. Availability: Subject to allocation control by Chemicals Division of War Production Board. Monsanto Chemical Co.

RESINOX 841

A melamine impregnated film. Suggested Uses: Bonding of high quality plywood including hardwood laminated structures for boat and aircraft use. Short bonding cycles and low curing temperatures permit production efficiency. Availability: Subject to allocation control by Chemicals Division of War Production Board. Monsanto Chemical Co.

RESINOX 6905

Composed of a phenol formaldehyde resin and a chopped cotton cord filler. Impact strength will range from 6.4 to 8.0 ft.–lbs./inch of notch as compared to 0.28 to 0.32 ft.–lbs./inch of notch for a wood flour filled product. Suggested Uses: Applications in the war effort for structural uses. It is designed especially for the molding of articles requiring high impact strength and a high degree of moldability. Available on high priority for military and essential civilian uses. Monsanto Chemical Co.

RESINOX 7013

A combination of phenol-formaldehyde resin and mica. By properly processing these two principle components, a molding composition having good dielectric strength and low power factor is obtained. Suggested Uses: Manufacture of coil forms, condensers, tube bases and various other electrical parts used in high frequency communication systems. Resinox 7013 is a special molding material for electrical insulation purposes. Available on high priority for military and essential civilian uses. Monsanto Chemical Co.

RPA NO. 5

Chemical and physical data will be furnished by WPB to interested prospective users. Suggested Use: Processing agent for synthetic rubber, GR-S. Its use in small amounts aids in milling and mixing this synthetic rubber thereby increasing the capacity of rubber processing equipment. E. I. du Pont de Nemours & Company, Inc.

SAFLEX 2112

Heat-sealing plastic resin. Solutions can be applied by conventional methods including spreading and roll coating. Solids content solutions can be varied to meet process requirements. Provides good uniform bonds over temperatures ranging from −40°F. to +170°F. Suggested Uses: For paper, fabric, cellophane, and metal-foil packaging materials. Is used as a heat-sealing agent for packaging munitions and military equipment. Availability: Subject to allocation control by Chemicals Division, WPB. Monsanto Chemical Co.

SAFLEX M

Modified polyvinyl butyral, plasticized and dissolved in suitable solvents for spreader application. Solids, 42-50%. Wt. per gal., approx. 8 lbs. Color, clear and colored (at present chiefly supplied in olive drab shades). Curing time, 5 mins. @ 180°F.; 30 mins. @ 150°F. Suggested Uses: Coatings for gas impermeable fabrics and raincoat fabrics or laminating adhesives for double textured material such as marine ponchos, heavy storm suits, enlisted men's raincoats and the like. Availability: In commercial quantities, but only for army, navy or lend-lease contracts. Monsanto Chemical Co.

SAFLEX TS

Properties of a representative compound of Saflex TS as used for army raincoats: Sp. gr., 1.65 @ 25°/25°. Tensile strength @ 25°C., 50% R. H., 1450 lbs./sq. in. % elongation at break @ 25°C., 50% R. H., 360%. % water absorption, 48 hrs. @ 25°C., 3.3%. Water diffusion, 0.09 fl. oz./ sq. ft./ day @ 25°C. Tackiness, non-tacky @ 180°F. Flexibility, stiff but does not crack when sharply flexed @ −40°F. Age resistance, 7 days in oxygen bomb @ 158°F. has no effect; 200 hrs. accelerated aging (Kline test) has no effect. Methods of processing: Can be handled on mills, spreading, and calendering equipment much the same as rubber. In general, thinner coatings are used than is the case with rubber. Suggested Uses: Saflex TS is the plasticized, heat curing polyvinyl butyral used for coating fabrics for army raincoats, hospital sheeting, water bags, marine ponchos and similar articles. Available only for applications for the armed forces and lend-lease. Monsanto Chemical Co.

SANTOMERSE 43

Organic amine salt of dodecyl benzene sulfonic acid. Suggested Uses: As oil-soluble wetting agent in preparing emulsions, grinding pigments, making inks. Available in sample quantities. Monsanto Chemical Co.

SANTOMERSE 43-P

Organic amine salt of dodecyl benzene phosphinic acid. Suggested Uses: As an oil-soluble wetting agent in preparing emulsions, grinding pigments, making inks. Available in sample quantities. Monsanto Chemical Co.

SANTOMERSE 83A

Organic amine salt of dodecyl benzene sulfonic acid. Suggested Uses: As an oil-soluble wetting agent in preparing emulsions, grinding pigments, making inks. Available in sample quantities. Monsanto Chemical Co.

SANTOMERSE OS

Organic amine salt of dodecyl benzene sulfonic acid. Suggested Uses: As oil-soluble wetting agent in preparing emulsions, grinding pigments, making inks. Available in sample quantities. Monsanto Chemical Co.

SANTOVAR O

An alkylated polyhydroxy phenol. Sp. gr., 1.095 @ 25°C. Melting point, above 190°C. Appearance, white solid. Solubility, 10 grs. in 50 c.c. of acetone. Suggested Uses: For preventing the deleterious action of oxygen and sunlight on uncured rubber and oils. Available in commercial quantities. Monsanto Chemical Co.

SANTOWAX MH

(Hydrogenated *m*-terphenyl)

$C_{18}H_{32}$. White crystalline solid. Melting point, about 50°C. (Literature gives m.p. for pure compound as 62.5-63.5°C.). Soluble in acetone, benzene and ethanol; insoluble in water. Suggested Uses: As a plasticizer. Availability: Laboratory samples. Monsanto Chemical Co.

SANTOWAX OM

71% *o*-Terphenyl and 29% *m*-terphenyl. A yellow, crystalline solid. Freezing point, 38°C. Solubility: Soluble in benzene, acetone and ethanol; insoluble in water. Suggested Uses: As a plasticizer. Availability: Pilot plant samples. Monsanto Chemical Co.

SANTOWAX OSA

A synthetic waxy solid. Density, 0.99 at 29°C. Softening point, 59-59.2°C. Crystallizing point, 50-52.2°C. Flash point, 246°C. Fire point, 279°C. Decomposition point, 232°C. Acid number, 4.7. Solubility: Insoluble in water. Soluble in benzene, trichlorobenzene, naphtha and turpentine. Only slightly soluble in ethanol. Suggested Uses: Good gloss characteristics. For use in polishes, wax finishes, paints, cosmetics and paper. Also as an opacifier and as a sealing compound. Availability: Pilot plant quantities. Monsanto Chemical Co.

SANTOWAX PH

(High melting isomer of hydrogenated *p*-terphenyl)

$C_{18}H_{32}$. White crystalline solid. Freezing point, 160°. Soluble in benzene and ethanol; insoluble in water. Suggested Uses: As an opacifying agent for molded paraffin articles; as a plasticizer. Availability: Laboratory samples. Monsanto Chemical Co.

SANTOWAX PSA

A high melting, synthetic waxy solid. Refractive index, 1.58. Density, 1.04 at 29°C. Crystallizing point, 135.5-136°C. Flash point, 268°C. Fire point, 318°C. Decomposition point, 193-204°C. Acid no., 0-1. Solubility: Insoluble in water. Soluble in hot benzene or trichlorobenzene. Only slighty soluble in hot ethanol, naphtha and turpentine. Suggested Uses: Good gloss characteristics. For use in polishes, wax finishes, paints, cosmetics and paper. Also as an opacifier and as a sealing compound. Availability: Pilot plant quantities. Monsanto Chemical Co.

SARAN FILM

A moisture barrier. In addition to its low moisture vapor transmission, it is doubly oriented giving it high strength in both directions. Saran Film retains the chemical resistance and non-flammability for which its base, Saran, is known. The Dow Chemical Co.

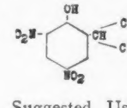
SEBACIC ACID

(Nopco 1010)

HOOC $(CH_2)_8$ COOH. Mol. wt., 202. Max. moisture, 1%. Less than 0.5% ash. Melting point, 129-133°C. White crystalline powder. Slightly soluble in hot water. Chemical Properties: Capable of forming salts with inorganic alkalies and organic amines. Capable of forming esters, amides, etc. Suggested Uses: Esters of sebacic acid can be employed as plasticizers in plastics, rubber, etc. Employed in alkyd modified resins. National Oil Products Co., Inc.

2-SEC-BUTYL-4,6-DINITRO PHENOL

Mol. wt., 239.2 Dark red oil which freezes on standing to an orange solid. Freezing point, 34°C.; sp. gr., 1.269 at 30/25°C. Soluble in acetone, chlorobenzene alcohol; insoluble in ethylene glycol, base oil; practically insoluble in water.



Suggested Uses: As an insecticide and weed eradicant. The Dow Chemical Co.

SHEETING, Coated

3.60-40 (56x60)

Suggested Uses: Army raincoat material, made according to Philadelphia Quartermaster Depot Specification 71F. E. I. du Pont de Nemours & Company, Inc.

SILICA AQUASOL

10%, SiO_2; 0.1%, Na_2SO_4 NaOH; balance, water. pH is 8.5. Stability, permanent. Color, hazy white. pH can be adjusted within the limits of 2.0 to 9.0 without affecting stability of Aquasol. Can be concentrated by boiling at atmospheric pressure to 20% SiO_2. Suggested Uses: Source of active colloidal silica for use in, binder for fine powder catalysts; re-enforcing carbon crucibles; as a thickening agent in printing inks; as a thickening, delustering and stiffening agent for paper and textiles; agent for wood impregnation; binder for moding sands; as a tanning agent; as an aid in drilling muds; as a filler or coating material for plastics; as a re-inforcing agent in latex where bright colors are desired; in plant insecticide sprays to increase adhesion; as a protective colloid for metal sols; for producing glaze in ceramics; as a waterproofing agent in concrete. Availability: Working quantities. Monsanto Chemical Co.

SODIUM FLUOSILICATE, FLUFFY

(Tinted Nile Blue)

Na_2SiF_6. Mol. wt., 188.05. Sp. gr., 2.679. Nile blue powder. Fineness: Minus 325 mesh. Solubility in water, .65% @ 17°C. Chemical Properties: Acid salt. Reacts with alkalies to form alkali fluoride and silica. Suggested Uses: An insecticide powder for household use. Effective against roaches, moths, flies and other insects. Available in commercial quantities. The American Agricultural Chemical Co.

SODIUM FLUOSILICATE, FLUFFY

(White)

Na_2SiF_6. Mol. wt., 188.05. Sp. gr., 2.679. White powder. Fineness: Minus 325 mesh. Solubility in water, .65% @ 17°C. Chemical Properties: Acid salt. Reacts with alkalies to form alkali fluoride and silica. Suggested Uses: An insecticide powder for household use. Effective against roaches, moths, flies and other insects. Available in commercial quantities. The American Agricultural Chemical Co.

SODIUM FORMATE, Technical

NaOOCH. Coarse, white, crystalline powder hygroscopic and very soluble in water. Suggested Uses: As a mordant in textile dyeing and printing and in various organic syntheses. Heyden Chemical Corp.

SODIUM IRON PYROPHOSPHATE

$Na_8Fe_4(P_2O_7)_5 \cdot 6H_2O$. Sp. gr., 2.75. Solubility in water, 0.001 gm./100 ml. @ 25°C. Brown amorphous powder. Chemical Properties: Iron firmly bound in a complex. Suggested Uses: Food fortification. Available in commercial quantities. Victor Chemical Works.

SODIUM PHOSPHO ALUMINATE

Readily soluble in water and forms a clear solution. Chemical Properties: Resistance to hydrolysis is superior to sodium aluminate and consequently solutions of sodium phospho aluminate are more stable. Suggested Uses: Designed to replace sodium aluminate wherever the latter material has been used. Has been used by the paper industry and in water treatments. American Cyanamid & Chemical Corp.

SODIUM POLYSULFIDE

Solids, 40%. Freezing point, below −5°F. Wt. per gal., 11.06 lbs. @ 60°F. pH 1% sol. of 100% sodium polysulfide, 11.0. Suggested Uses: Effective agent for dissolving certain undesirable precipitated proteins from hides or skins during the soaking operation. Also indicated for soaking back furs. Availability: Working quantities are available. Monsanto Chemical Co.

SODIUM POTASSIUM AMYL PHOSPHATE

60% solution in water. Color, straw. Odor, slightly of Pentasol. Sp. gr., 1.339. Wt. per gal., 11.2 lbs. pH, 7.0-7.3. Slightly hygroscopic. Anhydrous form, gelatinous. Suggested Uses: Flameproofing, for paper, textiles, etc., humectants; wool lubricants. Availability: For government contracts or upon allocation. Monsanto Chemical Co.

SODIUM POTASSIUM ETHYL PHOSPHATE

60% sol. in water. Color, water white, slight haze. Odor, slight ester. Wt. per gal., 11.4 lbs. Sp. gr., 1.37 @ 25°C. pH 60% sol., 7.0-7.4. Viscosity, 128 centipoises @ 25°C. Suggested Uses: Flameproofing for paper, textiles, etc., humectants; wool lubricants. Availability: For government contracts or upon allocation. Monsanto Chemical Co.

SODIUM TETRASULFIDE

Na_2S_4. Mol. wt., 174. Sp. gr., (40% solution), 1.335 @ 20°/15.5°C. Color, clear, deep red water solution. Suggested Uses: Soaking of hides and skins prior to unhairing, reduction organic nitro bodies, insecticide and fungicide for fruit tree spray, ore floatation reagent, reduction of cyanide plating baths, manufacture of sulfur dyes. Hooker Electrochemical Co.

SOLVENT EMULSION CLEANER (Pennsalt EC No. 10)

Self-emulsifying, non-phenolic type, solvent emulsion cleaner composed of emulsifying agents and suitable solvents. Suggested Uses: For removing grease, oil, smut, and drawing and buffing compositions from metals and painted surfaces. Cold application by brushing, spraying, or dipping in undiluted material. Also applicable to power washer and soak tank operations in water emulsion form or to increase effectiveness of alkaline cleaners. Combines soap emulsifying action with solvent penetration. Packed in 55 gal. steel drums. Pennsylvania Salt Mfg. Co.

SOLVIT A

Edible fatty acid ester of polyhydroxy carboxylic acids. Amber colored, clear, viscous liquid with acetic acid odor. Good dispersion in water. 1% dispersion has a pH of 3.7 and a surface tension of 34.8 dynes/cm. Acidity expressed as acetic acid, 4.3%; sp. gr., 0.96. (Contains no soap.) Non-toxic. U. S. Patent No. 2,236,517. Suggested Uses: Edilbe emulsifier for food and pharmaceutical emulsions, as in emulsification of vitamins. Approved by the American Medical Ass'n for its use in vitamins. The Emulsol Corp.

STYRALOY 22

Synthetic elastomer. Suggested Uses: For electrical and mechanical applications requiring low temperature flexibility and high temperature stability. The Dow Chemical Co.

SUCCINIC ANHYDRIDE

$C_4H_4O_3$. Mol. wt., 100.07. Crystallizing point, 118.0°C. Appearance, white crystalline material. Suggested Uses: In the manufacture of resins and in chemical syntheses. Status: Process demonstrated but not in production. Monsanto Chemical Co.

SULPRENE 56-40A (Norepol Analogue)

Millable polyester containing no compounding ingredients. May be compounded and vulcanized in the conventional rubber manner to give product having elongation of about 125 and tensile strength of 400-500 pounds. Suggested Uses: Non-critical replacement for rubber when high abrasion resistance and flexibility are not required. American Resinous Chemicals Corp.

TANAK MR

New melamine resin used for tanning. Suggested Uses: Produces white, stable leather by itself; improves fullness of the leather when used in conjunction with vegetable tannins, chrome salts or other tanning compounds. American Cyanamid & Chemical Corp.

TERGITOL PENETRANT 4 SLURRY

Special grade of "Tergitol" penetrant 4 contains 40% sodium tetradecyl sulfate and 60% water containing practically no inorganic salts or mutual solvents. Has appearance of "curds and whey." Suggested Uses: To enhance the activity of antiseptics and bactericides. Carbide and Carbon Chemicals Corp.

TERPHENYL, Mixed Isomers

$C_{18}H_{14}$. Mol. wt., 236. Density, 1.133 g./c.c. @ 25°C. Color (NPA), 4-5. Softens at 60°C. Completely liquid at 140°C. Distillation range D-20 modified (corrected), 364-418°C. Flash point, 191°C. Flame point, 238°C. Dielectric constant, 2.58. Resistivity in ohms/cm.^{3}, 140,000 x 10^9 @ 100°C., 35,000 x 10^9 @ 135°C., 550 x 10^9 @ 155°C. Soluble in benzene, trichlorobenzene, nitroethane, nitropropane. Suggested Uses: In the synthesis of dyes, drugs and other organic compounds. Available in commercial quantities. Monsanto Chemical Co.

m-TERPHENYL

$C_{18}H_{14}$. Mol. wt., 236. Density, 1.164 g./c.c. @ 25°C. Color (NPA), 2.2–4.2. Softens at 75°C. Completely liquid at 85°C. Distillation range D-20 (corrected), 370-378°C. Flash point, 207°C. Flame point, 229°C. Viscosity (Saybolt univ. sec.), 39.3 @ 210°F. Dielectric constant, 2.62. Resistivity in ohms/cm.^{3}, 2,600 x 10^9 @ 100°C. Suggested Uses: In the synthesis of dyes, drugs and other organic compounds. Available in commercial quantities. Monsanto Chemical Co.

o-TERPHENYL

$C_{18}H_{14}$. Mol. wt., 236. Density, 1.14 g./c.c. @ 25°C. Color (NPA), less than 3.0. Softens at 35°C. Completely liquid at 50°C. Distillation range D-20 (corrected), 320-355°C. Flash point, 171°C. Flame point, 193°C. Viscosity (Saybolt univ. sec.), 40 @ 210°F. Dielectric constant, 2.54. Resistivity in ohms/cm.^{3}, 8,200 x 10^9 @ 100°C. Suggested Uses: In the synthesis of dyes, drugs and other organic compounds. Available in commercial quantities. Monsanto Chemical Co.

p-TERPHENYL

$C_{18}H_{14}$. Mol. wt., 236. Density, 1.236 g./c.c. @ 25°C. Color (NPA), 0-1.25. Softens at 200°C. Completely liquid at 215°C. Distillation range D-20 (corrected), 381-388°C. Flash point, 207°C. Flame point, 238°C. Resistivity in ohms/cm.^{3}, 30 x 10^9 @ 250°C. Suggested Uses: In the synthesis of dyes, drugs and other organic compounds. Available in commercial quantities. Monsanto Chemical Co.

TERPIN HYDRATE, Technical

Purity, 95% min. Melting point, 112-116°C. Chemical Properties: The monohydrate of 1,8 terpin. Relatively insoluble. Crystallizes from water as rhombic bipyramids and prisms which tend to form a fine, dense matte. Suggested Uses: In preparation of U.S.P. terpin hydrate for pharmaceutical purposes; special impregnant to give stiffness; as a chemical intermediate in the preparation of many terpenic compounds. Hercules Powder Co.

TETRACHLOROQUINONE (Chloranil)

$C_6O_2Cl_4$. Mol. wt., 245.9. Golden-brown crystalline solid with a mild characteristic odor. Melting point, closed tube, 285-287°C.; decomposition temperature, 290°C. Insoluble in alcohol, benzene, ether, VMP naphtha and water. Slightly soluble in carbon tetrachloride and soluble in epichlorhydrin at 25°C. Suggested Use: As a rubber accelerator. The Dow Chemical Co.

TETRAHYDROFURFURYL OLEATE

$CH_3(CH_2)_7CH = CH(CH_2)_7COOCH_2OC_4H_7$. Mol. wt., 366.5. Sp. gr., 0.926 @ 15.5°/15.5°C. Refractive index, 1.4640. Color, yellow to light brown. Insoluble in water; soluble in alcohols, esters, ketones, hydrocarbons, and chlorinated solvents. Suggested Uses: Plasticizer for polyvinyl chloride films to impart flexibility at low temperatures; plasticizer for other film-forming materials. Hooker Electrochemical Co.

TETRAHYDROFURFURYL OLEATE, S-804

Empirical formula, $C_{23}H_{42}O_3$. Mol. wt., 366.6. Consistency, fluid. Color, dark yellow. Sp. gr., 0.923 @ 25°C. Solidif. point, 2-5°C. Volatility, 0.05% (4 hrs. @ 105°C). Acidity, 0.1 mg. KOH/g max. Soluble in alcohols, ketones, esters, aromatic and aliphatic hydrocarbons. Compatible with nitrocellulose, ethyl cellulose, vinyl acetate-chloride copolymer. Suggested Uses: Plasticizer for nitrocellulose, ethyl cellulose, vinyl acetate-chloride copolymer. Glyco Products Co., Inc.

TETRAHYDROFURFURYL PHTHALATE, S-774

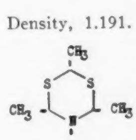
Empirical formula, $C_{18}H_{22}O_6$. Mol. wt., 432.4. Consistency, fluid. Color, amber. Sp. gr., 1.194 @ 25°C. Solidif. point, less than −15°C. Volatility, 1.2% (4 hrs. @ 105°C.). Acidity, less than 4 mg. KOH/g max. Soluble in alcohol, ketones, esters, aromatic and aliphatic hydrocarbons. Insoluble in water. Suggested Uses: Plasticizer for cellulose acetate, nitrocellulose, ethyl acetate. Glyco Products Co., Inc.

TETRAHYDROFURFURYL RICINOLEATE, S-758

Empirical formula, $C_{23}H_{42}O_4$. Mol. wt., 382.6. Consistency, fluid. Color, pale amber. Sp. gr., 0.955 @ 25°C. Solidif. point, −40 to −45°C. Volatility, 0.047% (4 hrs. @ 105°C.). Acidity, 0.1 mg. KOH/g max. Soluble in alcohols, ketones, esters, aliphatic and aromatic hydrocarbons. Insoluble in water. Compatible with nitrocellulose and ethyl cellulose. Suggested Uses: Plasticizer for nitrocellulose, ethyl cellulose, synthetic resins. Glyco Products Co., Inc.

THIALDINE

Density, 1.191. Flash point, 225°F. Colorless crystalline solid melting at 44 to 46°C. Soluble in alcohol, ether, hydrocarbons, but almost insoluble in water. Odor of the free base resembles that of hydrogen sulphide but this is almost non-existent in its salts. A promising heterocyclic intermediate containing both sulphur and nitrogen in the ring. Exhibits reactions typical of secondary amines. Suggested Uses: Of interest to manufacturers of dyestuffs, insecticides, pharmaceuticals, and rubber chemicals. Available in commercial quantities. Carbide and Carbon Chemicals Corp.



THIOSAN

Active ingredient (50%) is tetramethyl thiuramdisulfide. Relatively non-poisonous, containing neither mercury or other metals. Suggested Uses: Non-mercurial fungicide. For application to golf and lawn turfs as a spray for brown patch control. DuPont-Semesan Co. (E. I. du Pont de Nemours & Co., Inc.)

TIN TETRAPHENYL

$C_{24}H_{20}Sn$. White, crystalline material. Melting point, 224-226°C. Boiling point, 420°C. (uncorrected). Solubility: Soluble in benzene, carbon tetrachloride, chlorobenzene, etc. Slightly soluble in alcohol. Insoluble in water and ether. No appreciable decomposition upon distillation at atmospheric pressure. Suggested Uses: Organic synthesis. Availability: Laboratory samples. Monsanto Chemical Co.

m-TOLYL DIETHANOLAMINE

$C_6H_4CH_3N(CH_2CH_2OH)_2$. B. P., 173°C. (2.5 mm.). Solubility in water, slight at room temperature, but complete in boiling water. White crystalline solid, melting at 71°C. Commercial material is brown and melts at 66 to 68°C. Chemical Properties: Similar to those of phenyl diethanolamine, but its derivatives are usually more soluble in hydrocarbons and less soluble in water. Suggested Uses: By coupling it with diazotized nitro-anilines, dyes are obtained which impart brown to red-brown shades to leather. Couplings with other diazotized bases to give violet dyes for cellulose acetate. May be condensed with *o*-chlorbenzaldehyde to yield a dyestuff, producing fast yellowish-green shades on cotton. Insecticides or dyestuff intermediates are formed by reaction with vinyl *p*-tolyl sulfone. Carbide and Carbon Chemicals Corp.

TRI-*n*-AMYL PHOSPHATE

$(n\text{-}C_5H_{11})_3PO_4$. Mol. wt., 308. Sp. gr., 0.947 @ 25°C. Boiling point, 195-200°C. (20 mm.). Flash point, greater than 300°F. Soluble in alcohol, acetone, ether, toluene, naphtha, carbon tetrachloride. Free acidity, cc. O.1N NaOH/10 cc., less than 0.1. Colorless liquid. Suggested Uses: Plasticizer, solvent, alkylating agent, anti-foaming agent. Available only in small quantities for experimental investigation. Victor Chemical Works.

TRICHLORETHANE

$ClCH_2CHCl_2$. Mol. wt., 133.4. Sp. gr. at 20/20°C., 1.4432. Boiling point at 760 mm., 113.7°C. Colorless, volatile, non-flammable liquid soluble in most organic solvents, but difficultly soluble in water (0.48 per cent at 25°C.). Stable under ordinary conditions of use. Uses: A good solvent and extractant for most oils, fats, and waxes, as well as natural and certain types of synthetic rubber. Carbide and Carbon Chemicals Corp.

TRI(HYDROXYETHYL DIOXY-ETHYLENE)PHOSPHATE

$(HOCH_2CH_2OCH_2CH_2OCH_2CH_2)_3PO_4$. Mol. wt., 494 (approx.). Sp. gr., 1.220 @ 29°C. Soluble in water, alcohol, acetone, chloroform. Slightly colored, syrupy liquid (technical purity). Chemical Properties: Polyhydroxy compound capable of reacting at the hydroxy groups. Suggested Uses: Chemical intermediate, glycerine substitute, softener, humectant, plasticizer. Available only in small quantities for experimental investigation. Victor Chemical Works.

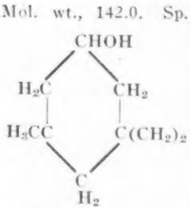
TRIETHYLENE GLYCOL

$HO.CH_2CH_2.O.CH_2CH_2.O.CH_2CH_2.OH$. Mol. wt., 150.2. Clear, colorless to pale straw-colored liquid. Boiling range, 5-95%, 275-295°C.; sp. gr., 1.122-1.126 at 25/25°C.; acidity (as acetic acid), 0.01% max.; water content, 0.02% max.; color (APHA) 60 max. Suggested Uses: As a sterilizing agent in air conditioning, in the dehydration of gases, as a solvent for various gums and resins, as a plasticizer and humectant, and in organic syntheses. The Dow Chemical Co.

TRIGLYCOL DICHLORIDE

$Cl(CH_2CH_2O)_2CH_2CH_2Cl$. Mol. wt., 187.07. Sp. gr. at 20/20°C., 1.1974. Boiling point, 241.3 (760 mm.). Solubility in water, 1.9%. Resembles dichlorethyl ether, but is slightly more soluble in water and less volatile. Uses: As a chlorinated solvent and extractant because of its excellent dissolving power for oils and hydrocarbons. It shows promise wherever low volatility is desired, such as for plasticizer applications. By exchanging its chlorine atoms for other chemical groups, it offers possibilities as an intermediate for making dyes, resins, or insecticides. Carbide and Carbon Chemical Corp.

3,3,5-TRIMETHYLCYCLO-HEXANOL-1



Mol. wt., 142.0. Sp. gr., 0.878 @ 40/20°C. B.P., 198°C. (760 mm.). M.P., 35.7°C. Odor, menthol-like. Soluble in most organic solvents, hydrocarbons, and oils. Suggested Uses: Potential mutual solvent and coupling agent for many otherwise immiscible liquids, and, therefore, a promising replacement for cyclohexanol and methyl cyclohexanol in such applications. Should have value as an anti-foaming agent. Useful for the introduction of the trimethylcyclohexyl group into other compounds to increase their hydrocarbon solubility and decrease their water-solubility. Other possible applications suggested for its use include the preparation of plasticizers, xanthates, and wetting agents. Available in "research" quantities only. Carbide and Carbon Chemicals Corp.

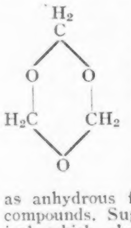
TRIMETHYL PHOSPHATE

$(CH_3)_3PO_4$. Mol. wt., 140. Sp. gr., 1.217 @ 25°C. Boiling point, 85-90°C. (20 mm.). Melting point, -45°C. Flash point, greater than 350°F. Soluble in water, alcohol, acetone, ether, toluene. Free acidity, cc. O.1N NaOH/10cc., less than 0.1. Colorless liquid. Suggested Uses: Plasticizer, coolant, methylating agent, solvent. Available in semi-works quantities. Victor Chemical Works.

TRIOCTYL PHOSPHATE

$(C_8H_{17})_3PO_4$. Mol. wt., 434. Sp. gr., 0.924 @ 26°C. Boiling point, 220-230°C. (8 mm.). Flash point, greater than 300°F. Soluble in alcohol, acetone, ether, toluene, naphtha, carbon tetrachloride. Free acidity, cc. O.1N NaOH/10 cc., less than 0.5. Slightly colored liquid. Suggested Uses: Plasticizer, solvent, alkylating agent, anti-foaming agent, additive. Available in semi-works quantities. Victor Chemical Works.

TRIOXANE



Colorless crystalline compound which is a stable cyclic, trimeric polymer of formaldehyde. It is a true cyclic ether. Readily soluble in alcohols, ketones, ethers, esters, chlorinated hydrocarbons, vegetable oils and aromatic hydrocarbons. It is soluble also in molten phenol and naphthalene. It is only slightly soluble in petroleum ether. In the presence of strong mineral acids or acidic materials, trioxane reacts as anhydrous formaldehyde with many organic compounds. Suggested Uses: An unusual chemical which should have value as a chemical specialty in its own right and as a special form of anhydrous formaldehyde for use as a chemical intermediate. Molten trioxane is a good solvent for various materials, e.g., phenols, aromatic hydrocarbons, amides such as urea, and many other types of organic compounds. E. I. du Pont de Nemours & Co., Inc.

TRI-*n*-PROPYL PHOSPHATE

$(n\text{-}C_3H_7)_3PO_4$. Mol. wt., 224. Sp. gr., 1.012 @ 25°C. Boiling point, 135-140°C. (20 mm.). Fluid at -80°C. Flash point, greater than 300°F. Soluble in alcohol, acetone, ether, toluene, naphtha, carbon tetrachloride. Free acidity, cc. O.1N NaOH/10 cc., less than 0.1. Colorless liquid. Suggested Uses: Plasticizer, solvent, alkylating agent. Available only in small quantities for experimental investigation. Victor Chemical Works.

TRI-*o*-XENYL BORATE

$(C_6H_5.C_6H_4.O)_3B$. Mol. wt., 518.4. Viscous amber liquid with typical phenolic odor. Solidifies on standing to a crystalline material. Boiling point, 330°C. at 0.3 in Hg; sp. gr., 1.08 at 105°C. Soluble in benzene, carbon tetrachloride and ether. Decomposes in water. Suggested Uses: As a plasticizer and as an athlete's foot control. The Dow Chemical Co.

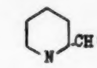
URIC ACID C.P.

NHCONHCOC=CNHCONH. Mol. wt., 168.11. Fine white crystals, no definite melting point. Insoluble in water, soluble in aqueous alkali solution, concentrated sulfuric acid. Ash less than .1%, moisture less than .2%, assay 98+%. Chemical Properties: Undergoes oxidation under acid, neutral and alkaline conditions to give a variety of oxidation products. It forms salts with many metals. Suggested Uses: Starting material for manufacture of chemicals, pharmaceuticals, etc. Available from stock. Shipping regulations: Chemicals NOIBN. The Edwal Labs., Inc.

VEGIMAL

Vegetable base liquid adhesive compound made by conversion of domestic starches with added plasticizing chemicals. Viscous, tan colored liquid, freely miscible with water. Weight, 10 lbs. / gal. The spread film is instantly "tacky" and remains so for considerable periods of time before drying. Working range and flexibility is similar to animal base adhesives. Non-warp qualities, shrinkage of film, and duration of "tacky" state adjusted by amount of water dilution, thickness of applied film, and temperature of solution. Can be applied by brush, machine roller applicators, spreader, dipping or spray gun. Suggested Uses: Laminating, sizing, coating, sealing of paper, cardboard, fabric, leather, wood, and similar porous materials. Paisley Products, Inc.

2-VINYLPYRIDINE



Contains an inhibitor to prevent polymerization. Inhibitor can be eliminated by vacuum distillation. Boiling point, boils (with resinification) of about 159°C. (76 mm.). Solubility: Soluble in water to the extent of about 2.5% and is freely soluble in dilute acqueous acid solutions. Soluble in all common organic solvents, including aromatic and aliphatic hydrocarbons, alcohols, ketones, esters, etc. About 15% water dissolves in 2-vinylpyridine. Approx. wt./gal., 8 lbs. Suggested Uses: Manufacture of synthetic elastomers, pharmaceuticals, and in organic syntheses. Reilly Tar & Chemical Corp.

VULCANOIL H

Vulcanized vegetable and animal oil combination. Suggested Uses: Impregnate leather to preserve it and render it water and mildew resistant. Increases wet abrasion resistance and renders the leather pliable. American Resinous Chemicals Corp.

WETTING AGENT, S-726

A specially stablized aryl alkyl sulfonate stable in hard water and dilute salt water. Consistency, fluid. Color, amber. Sp. gr., 1.090 @ 25°C. Soluble in water. Essentially soluble in alcohols, ketones, esters. Insoluble in hydrocarbons, but will emulsify them in water. Suggested Uses: Wets well in medium salt concentrations (10% sodium chloride, sea water, hard water). Glyco Products Co., Inc.

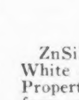
WETTING AGENT, S-784

A specially stabilized aryl alkyl sulfonate, stable in high salt concentrations. Consistency, fluid. Color, amber. Sp. gr., 1.090 @ 25°C. Soluble in water. Essentially soluble in alcohols, ketones, esters. Insoluble in hydrocarbons, but will emulsify them in water. Suggested Uses: Wets well in high salt concentrations. Glyco Products Co., Inc.

WITCOGUM (New Chemurgic Rubber)

Rubber-like material developed from vegetable oils. Resilient, dark colored, spongy material with sp. gr. of 1.19. Plyable, can be compressed without crumbling. May be milled on standard rubber mills and processed in regular rubber extruders, calenders and vulcanizers. Cured Witcogum products, when properly compounded, have properties within the following ranges: tensile, 300-450 lbs./sq. inch; elongation at break, 100-150%; hardness(shore), 35 to 90; tear resistance, 30-70 lbs./sq. inch. Contains accelerator of guanidine type, sulfur, and all necessary vulcanizing ingredients, though it may be loaded and softened as required. May be used independently or as extender blended with natural rubber, reclaim, or synthetic rubber. Not affected by water, alcohol, or lubricating oils. Suggested Uses: Hose, tubing, wire insulation, gaskets, shims, brake linings, hospital sheeting, foot comfort pads and similar applications where service requirements are not too high. Available in unlimited quantities. Wishnick-Tumpeer, Inc.

1,2,4 XYLENOL



Purity, 95% min. Also other grades available. Distillation range, 95% shall distill within a range of 2°C. including temperature of 226.5°C. Freezing point, 62°C. min. Solubility: Very slightly soluble in water. Soluble in most common organic solvents, including alcohols, ethers, ketones, esters, aliphatic and aromatic hydrocarbons, and chlorinated aliphatic and aromatic hydrocarbons. Approx. wt./1 gal., 8.45 lbs. (melted liquid). Suggested Uses: Production of resins, various organic syntheses. Cont.—325-lb. open head drums (non-returnable); 225-lb. wooden barrels; 25-lb. cans. Reilly Tar & Chemical Corp.

ZINC FLUOSILICATE

$ZnSiF_6.6H_2O$. Mol. wt., 315.54. Sp. gr., 2.104. White crystals. Very soluble in water. Chemical Properties: Acid salt. Reacts with alkalies to form alkali fluoride and silica. Grade: Technical. Suggested Uses: Hardening and waterproofing concrete. In laundries for neutralizing the alkali in rinse water. Wood preservative. Available in commercial quantities. The American Agricultural Chemical Co.

COMPANIES WHOSE NEW PRODUCTS ARE DESCRIBED IN "NEW CHEMICALS FOR INDUSTRY"

American Agricultural Chemical Company
50 Church Street
New York, N. Y.

American Cyanamid & Chemical Corporation
30 Rockefeller Plaza
New York, N. Y.

American Resinous Chemicals Corporation
Peabody, Massachusetts

Attapulgus Clay Company
260 South Broad Street
Philadelphia, Pa.

Berk & Company, Inc., F. W.
Wood Ridge Division
Wood Ridge, N. J.

Carbide and Carbon Chemicals Corp.
30 East 42nd Street
New York, N. Y.

Commercial Solvents Corporation
17 East 42nd Street
New York, N. Y.

Cornelius Products Company
432 Fourth Avenue
New York, N. Y.

Diamond Alkali Company
535 Smithfield Street
Pittsburgh, Pa.

Dow Chemical Company
Midland, Mich.

Du Pont de Nemours & Company, Inc., E. I.
Wilmington, Del.

Edwal Laboratories, Inc., The
732 Federal Street
Chicago, Ill.

Emery Industries Inc.
Cincinnati, Ohio

Emulsol Corporation, The
59 East Madison Street
Chicago, Ill.

Fairmount Chemical Co., Inc.
600 Ferry Street
Newark, N. J.

G and A Laboratories Inc.
Savannah, Ga.

Givaudan-Delawanna, Inc.
330 West 42nd Street
New York, N. Y.

Glyco Products Co., Inc.
26 Court Street
Brooklyn, N. Y

Hercules Powder Company
Wilmington, Del.

Heyden Chemical Corporation
50 Union Square
New York, N. Y.

Hilo Varnish Corporation
42-60 Stewart Avenue
Brooklyn, N. Y.

Hooker Electrochemical Company
Niagara Falls, N. Y.

Lucidol Corporation
1740 Military Road
Buffalo, N. Y.

Monsanto Chemical Company
St. Louis, Mo.

National Aniline Division
Allied Chemical & Dye Corp.
40 Rector Street
New York, N. Y.

National Oil Products Company
First and Essex Streets
Harrison, N. J.

National Wax Refining Company
4415 Third Avenue
Brooklyn, N. Y.

Niacet Chemicals Corporation
Pine Avenue and 47th Street
Niagara Falls, N. Y.

Onyx Oil & Chemical Co.
15 Exchange Place
Jersey City, N. J.

Paisley Products, Inc.
1770 Canalport Avenue
Chicago, Ill.

Pennsylvania Salt Manufacturing Co.
1000 Widener Building
Philadelphia, Pa.

Philadelphia Quartz Company
121 South Third Street
Philadelphia, Pa.

Reilly Tar & Chemical Corporation
Merchants Bank Bldg.
Indianapolis, Ind.

Stroock & Wittenberg
60 East 42nd Street
New York, N. Y.

Victor Chemical Works
141 West Jackson Blvd.
Chicago, Ill.

Wishnick-Tumpeer, Inc.
295 Madison Avenue
New York, N. Y.

Wolf & Company, Jacques
Passaic, N. J.

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Madison Square Garden, New York, N. Y.—December 6 to 11, 1943

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NEW PRODUCTS & PROCESSES

Chemically-Treated Wood

New chemical treatments that virtually endow wood with the properties of a plastic and give it added strength, wearing qualities, hardness, and warp and swell resistance were described recently by Dr. J. F. T. Berliner of the Ammonia Department of E. I. du Pont de Nemours & Company, in an address before the Eastern Lumber Salesmen's Association in Philadelphia.

Describing the new treatment by which poplar, for example, can be made as hard or harder than hard maple and given form stability and other desirable properties, the speaker said:

"It has been found that when wood is impregnated with a resin solution such as a lacquer, the resin may fill the wood cells but the properties of the wood are not fundamentally altered. It will still shrink and swell with changes of humidity, and the grain will raise when a sanded face is exposed to moisture.

"However, if the wood is impregnated with resin-forming chemicals capable of reacting with the wood cellulose, and the resin then produced within the wood, the properties of the wood are profoundly altered. When sufficiently treated, the wood is dimensionally stable under varying humidity conditions, does not show grain raising, is hardened, can be highly polished, has increased wearing qualities, and has markedly increased compressive strength as well as much higher strength in tension across the grain. In fact, the tensile strengths in all directions tend to be the same, a most unusual property for wood."

Soft maple thus treated may even be used to replace dogwood in textile shuttles, Dr. Berliner stated. Here the compressive strength of wood as well as its hardness and resistance to moisture can be so increased that treated wood may be substituted for steel in certain textile machinery parts where wood has hitherto been unusable.

The speaker noted the post-war possibilities of dimensionally stable lumber to eliminate the sticking drawer, door or window, and of finishes formed in the wood so that beautiful woods like cypress could be used for purposes other than paneling, sidings, shingles and tanks.

An important development of the war period has been the production of large composite beams, arches, boards and the like from small, readily produced, easily dried sections by gluing, he said. Boards and sections in sizes unobtainable from natural sources are now in regular production.

"You do not have to have a big tree to get big timbers, structural members, or boards," he stated. "Heretofore one had to seek long and far to obtain a 12 by 12 inch side-cut oak timber and then wait several years to condition it for use. Now, however, small sections of oak may be cut and fabricated into a 12 by 12 inch in a matter of a week or so."

He described the introduction of chemicals which allow wood to be readily bent and shaped like a plastic as follows:

"Wood is impregnated by soaking the green wood in a water solution of urea or by subjecting the wood to heat and pressure in the presence of urea. The urea-treated wood when heated to temperatures near the boiling point of water becomes plastic and is readily bent. On cooling, it regains its original rigidity and retains the shape given it while hot. On heating, it may again be softened."

Resin Coating and Tape

Two new products for covering plating racks, widely used in many varied industries, made from Koroseal, its plasticized polyvinyl chloride thermoplastic material has been announced by The B. F. Goodrich Company.

One is known as Koroseal Tape RX, while the second is Koralac RX, a solution of Koroseal. In some applications the two are used together, with the tape being applied after the rack has been coated with the solution, while in other cases they may be used separately.

Koroseal Tape RX possesses good resistance to wear and abrasion, has excellent insulating properties and can be used for practically all kinds of plating service, since it has remarkable resistance to all plating solutions, including chromic, alkali and acid dips, the company's announcement says.

Length of service from a rack covered with Koroseal Tape RX depends on the physical use to which the rack is subjected and not upon chemical deterioration of the tape, which, the company claims will withstand more severe service than other liquid coatings now in use. Any shape or style of plating rack which can be covered with regular friction tape can use the new product.

Made in glossy black, Koroseal Tape RX is supplied in one pound rolls, containing approximately 170 lineal feet, ¾ inches wide by .014 inches thick, with the tolerance on width plus or minus 1/16 inches and plus or minus .002 inches on thickness.

No special equipment is needed when Koroseal Tape RX is used in conjunction with Korolac RX solution, the rack being first treated with two or three coats of the solution and the tape then wrapped under firm tension, after which one or two more coats of the solution are again applied. If the tape is used alone, the rack must be placed in an air oven with a minimum temperature of 300 degrees Fahrenheit for two hours after the tape has been applied. This fuses the tape toegther.

The plating rack solution Koralac RX provides a corrosion resistant, tough, inert coating with good insulating properties, satisfactory for nearly all kinds of plating rack service. Liquid at room temperature, it holds its position on the racks after application because of shrinkage as the solvent evaporates.

The solution is supplied in one and five gallon cans and 50 gallon drums. One gallon will coat approximately 80 square feet with a film thickness of .0015 inches when the dip method is used.

Micro-Crystalline Wax Substitute

To meet the growing shortage of micro-crystalline wax, Wishnick-Tumpeer, Inc., has developed a new group of waxes for use in the manufacture of ordnance wraps and other military and essential civilian products.

Witco Hamp Wax as the new material is called, is a hard amorphous petroleum wax of the greaseproof type, which possesses an exceptionally high resistance to moisture vapor transmission. It has been tested and approved by leading manufacturers of grade C ordnance wrap who are using it successfully.

Several grades of Hamp Wax, to cover a wide range of applications, are now being manufactured at the Wishnick-Tumpeer plant in Chicago. This product is not on allocation and, therefore, may be obtained on application providing orders designate either 100 per cent military or essential civilian use. Its general uses are for waterproofing ends of bags for export shipments and for manufacture of ordnance papers and similar applications where melting point, hardness and other properties of this range are desired.

Series of Plasticizers and Softeners

A series of new plasticizers and softeners for use in coatings, adhesives, plastics, cellulose esters and ethers, synthetic resins and synthetic rubbers, is now being produced commercially by Glyco Products Co., Inc. They consist of alkyl and alkyl

ether esters of higher fatty acids and dicarboxylic acids. They are characterized by their low freezing points and very mild odors.

Paint Progress

New and improved finishes ranging from white paint, with pigment having one-third more hiding power, to rust-inhibitive priming coats over metal were forecast recently by Dr. D. H. Dawson, research supervisor of the Du Pont Company Pigments Department, before the technical symposium of the Paint and Varnish Production Clubs' meeting in Cleveland.

Further, Dr. Dawson predicted a decided post-war preference for brilliant colors, improvements in the new resin emulsion paints that are thinned with water, and low brightness infra-red reflectance paints for civilian use.

"Paint will be greatly improved as a result of wartime developments, although the need for new manufacturing equipment may delay these new finishes from becoming generally available immediately after the war," the Du Pont chemist said.

"Post-war paints will probably make those previously manufactured look dull. Recently, stronger organic pigments have been developed to take the place of weaker inorganic colors. An immediate demand for bright colors was felt after the last war, and this time the toning down has been much more general because of industrial camouflage and blackouts.

"Color will undoubtedly extend into fields where previously it was a minor factor. Railroad and ship lines were adopting attractive color schemes before the war. The expanding airplane industry may set a trend in decorative finishes to parallel that in the automotive field."

He described as a major wartime development the new high-hiding, chalk-resistant titanium dioxide white pigment in which the crystalline structure was altered to a denser arrangement of atoms in the molecule. This new so-called rutile type of titanium pigment is not only about one-third more opaque than previous white pigments but has superior resistance to chalking and fading.

The resin emulsion paints, "a most startling wartime development," will doubtless undergo improvement utilizing the more durable synthetic resins. Low brightness infra-red reflectance paints were also mentioned as war-perfected finishes of possible future value to the civilian.

"Zinc yellow pigment has witnessed phenomenal growth during the war period, due to its almost universal adoption for non-ferrous metal primers and its increasing use in ferrous metal primers, as in the Navy Bureau of Ships practice. The improvements which have been made in this pigment, its lower cost and wide availability, together with the expected large demand for metal priming paints, will doubtless lead to its widespread adoption.

"In view of the radical modifications represented by the new paint technology, it is not reasonable to expect these improvements to be available overnight, when the war ends. New equipment first of all will be required. Manufacturing alterations involved in reformulation will require some time. But profound changes in paints for the civilian are certain."

Glass-Plastic Material

A new material now being employed in aircraft construction and possessing hitherto unattainable strength in proportion to weight, was described recently at the annual dinner of the Industrial Minerals Division of the American Institute of Mining and Metallurgical Engineers by Games Slayter, vice president and director of research of Owens-Corning Fiberglas Corporation.

The new material is a plastic reinforced with glass fibers. Experimental samples, according to Mr. Slayter, have been produced with tensile strengths of over 80,000 pounds per square inch. While the impact strength of ordinary plastics is about two foot pounds on a standard test, samples of the glass and plastic combination have shown impact resistance of over 20 foot pounds.

Another important feature of the new material, Mr. Slayter said, is that it can be molded into aircraft structural parts with low pressures and without the use of expensive molds. This reduces both the cost of fabrication and the number of man-hours required. The material can be machined and has the dimensional stability of the metals.

Explaining the principle involved in the manufacture of glass and plastic combinations, Mr. Slayter said, "All materials contain imperfections. If the material is uniform in its structure, stresses accumulate around the imperfections. Cracks propagate across the material and the material fails. Nature guards against failure of her strong materials by fiberizing them. A tree consists of cellulose fibers bonded with lignin.

"When we draw glass into fine fibers and combine them with a plastic we distribute the imperfections so that there is not one chance in a million that those in one fiber will match with those in another. The finer the fibers, the wider is the distribution of imperfections, and the smaller is the possibility that a stress accumulating at an imperfection will propagate through the mass."

Continuous filament glass fibers now produced on a commercial scale have an average diameter ranging from 23 one-hundred-thousandths of an inch to 38 one-hundred-thousandths of an inch, and a tensile strength varying from 350,000 to 450,000 pounds per square inch. Fibers are being produced experimentally ranging in diameter down to 2 one-hundred-thousandths of an inch. Fibers of this diameter have been measured with tensile strength as high as 3,500,000 pounds per square inch.

Penicillin Drying Process

A new high vacuum diffusion process developed by the National Research Corporation of Boston and adapted to the drying of penicillin is believed to solve the problem of processing the active germ- killing organism once it is extracted on the large scale planned. The process is being made available royalty-free for the production of penicillin in government-sponsored plants during the war emergency.

On the basis of preliminary tests, the Chemicals Division of the War Production Board believes that the 20-40 hour cycle now considered necessary for processing penicillin in the last stage can be reduced through this high vacuum diffusion method to six hours, and the cost of dehydration cut to one-sixth of any conventional method.

Since penicillin in solution form, after extraction from the mold, is an unstable product, dehydration is necessary. The use of heat to accomplish this is out of the question, so the dehydration is achieved through vacuum. Heretofore, steam ejectors, mechanical pumps, and a freezing method utilizing a cold trap have been used on a limited scale in vacuum dehydration.

The problem, however, is an extremely difficult one. The penicillin is in a frozen state when it is dehydrated, the moisture being removed in vapor form without liquefaction. Because of the enormous expansion of gases under the high vacuum employed, a pumping system of tremendous capacity is required to exhaust the great volume of vapor. Some idea of the volume of gas which must be handled can be gained from the fact that an ice cube weighing one ounce represents at ordinary atmospheric pressure a little over a cubic foot of water vapor. At the low pressure involved in this process, this ice cube expands into more than 25,000 cubic feet of vapor.

Freezing methods of vacuum dehydration have heretofore been handicapped by the building up of heavy ice layers in compartments specially designed to collect the vapor as evolved. Difficulties have also been experienced in attaining

extremely low pressures. In the vacuum diffusion process as developed by the National Research Corporation, residual air pressures are reduced to less than one ten-thousandths of an atmosphere with the aid of special high vacuum pumps of tremendous capacity. The water vapor is continuously removed from the pumping system at very low temperatures in the form of ice by means of a rotary condenser.

In drying penicillin, as well as blood plasma and certain drugs it is imperative that all moisture be removed. Extracting the last 2 per cent of water vapor ordinarily has taken as much time and is more difficult than driving off all the rest of the original content. Since even minute amounts of moisture are harmful, proper desiccation and packaging are highly important parts of the whole process, and have proved costly and troublesome to firms making penicillin. Packaging in permanent containers, incidentally, is also done under high vacuum, to insure that no harmful moisture will be picked up.

Unlike some vitamins and drugs which have yielded the secret of their chemical combination under investigation so that they could be reconstructed with common chemical building blocks, penicillin's structure is so complicated it may defy analysis for a long time.

The National Research Council's recommendations have channeled WPB activity along the line of production from the natural common mold. This growth, which is found on oranges and bread, requires about ten days by the flask method and three to five days in large tanks. Currently about twenty drug manufacturers are concentrating on expanding production of the raw material.

Synthetic Rubber Sponge

Manufacture of a general purpose synthetic rubber sponge is announced by The B. F. Goodrich Company. It is made in three densities, soft, medium and firm grades. Each has good oil resisting properties, and can be made into slabs, cord, tubing, or in almost any other molded shape. The grades correspond pretty well with the pre-war crude rubber sponge.

Slabs 24" by 120" can be made in thickness of 1/8, 3/16, 1/4, 3/8 and 1/2 inch and 24" by 60" slabs in the 3/4 and one inch thicknesses.

New Film-Forming Resin

A new film-forming resin with properties which promise to make it valuable for containers for food products, chemicals, precision machine parts, and heat-sealed moistureproof packages in general, has been developed by the Department of Agriculture.

Scientists of the Northern Regional Research Laboratory at Peoria, Illinois, where the discovery was made, say that this thermoplastic resin can be made from any vegetable oil that is rich in linoleic acid. Soybean and linseed oils are being used at present.

Tests indicate that this product may be used for laminating and moisture-proofing cellophane, aluminum and lead foil, glassine, and kraft and sulfite papers. It has excellent adhesion to most surfaces and good resistance to water, alkali, acid, vegetable oils, and some organic solvents. It is promising as a substitute for shellac.

Norelac, the name of the new resin, is derived from the first two letters of NOrthern and REgional, the name of the laboratory, and the first three letters of LACquer.

New Filler

Amyloform is a new formaldehyde-carbohydrate condensation product with distinctive new properties developed by the Perkins Glue Company.

The material is an extremely finely divided soft white organic powder with a large specific surface. As a strong preservative, it inhibits fermentation, mold growth and decay. It is unusually inert for a soft organic material, and its resistance to change compares favorably or exceeds the more durable resins.

This unusual material suggests possibilities as a filler and extender for cements, puttys, adhesives, enamels, paints, explosives, insecticides, preservatives, polishes, molded plastics, match heads, as a reinforcing agent for natural and synthetic rubber, and as an adsorbtion base for extending colors. Additional properties are as follows:

Particle Size: .001 on average diameter.

Color: White.

Odor: Of Formaldehyde, but this can be eliminated if desired.

Burning: Will not support combustion.

Effect of Heat: No effect up to 300°C. Decomposes at 350°C.

Mineral Matter: 0.5 or less.

pH: Usually about 7.0—This can be adjusted as desired.

Resistance to Chemical Action: Water:—Long periods of exposure to cold or boiling water causes no change. Strong or Weak Alkalies:—Cold or boiling solutions have little effect. Strong Acids:—Concentrated cold and dilute hot solutions cause gelatinization and decomposition. Organic Solvents:—Have no effect. Corrosive Salts:—Have little or no effect in cold or boiling solutions.

New Polyvinyl Resin Line

Something new has been added to the growing list of synthetic plastics. A group of coal-limestone-and-air derivatives called "compar" has been developed in a number of variations by the Resistoflex Corporation. According to the company the compar line grew out of the demand by warplane designers for a flexible material to handle toluol, xylol and benzol, which are present in high-power gasolines.

The name "compars" is used to distinguish between the basic polyvinyl alcohol resins, which are water soluble powders and the many derivatives, compounds and modifications, developed by the Resistoflex Corp., which have physical properties entirely unlike the original resin. The name of these latter rubber-like materials derives from the letters in the words "Compounded Polyvinyl Alcohol Resin."

The compars are described by Resistoflex officials as "transparent, flexible, rubber-like plastic materials, five to twenty times more wear-resistant than natural rubber, and the most solvent-proof rubber-substitute yet developed."

One of the major applications which has been developed is in the construction of hose and hose assemblies. High octane aircraft gasoline containing up to 40% or more of hard-to-handle aromatic hydrocarbons must be handled; diesel fuels may not be contaminated by fuel line erosion; fine orifices or delicately balanced parts of hydraulic mechanisms or lubricating systems must not become gummed or clogged due to attack by the hydraulic or lubricating oils on the inner wall of the hose; flexible non-metallic conduits must carry refrigerant or other toxic gases without leakage. Moreover, all of these difficult tasks must be performed regardless of the scalding heat of the desert or the searing cold of the stratosphere.

Resistoflex transparent tubing, also made of compar, affords the laboratory worker, doctor, dentist or other scientist a new flexible conduit. Transparent, as its name implies, it permits direct observation of the flow of liquids. Chemically unaffected by almost all organic solvents, it can be used in contact with many liquids which ordinarily cause deterioration. The further advantage of this tubing lies in its real imperviousness to gases.

Resistoflex compar materials are also used for washers, gaskets and seals for holding hard-to-handle solvents, aligning rings for the assembly of radio tubes and other electronic devices, transmission rings for delicate driving mechanisms, diaphragms of various kinds, gloves and other protective clothing.

Compars are also available in solution form of specific formulations for particular applications. One of these is for coating the wire baskets used for transporting and degreasing airplane and other metal parts. Another solution, when applied to the welts and uppers of industrial shoes, effectively oil-proofs and solvent-proofs the shoes, protecting both the shoes and the worker's feet from these materials. Other solutions are available for coating wood, fabric and paper.

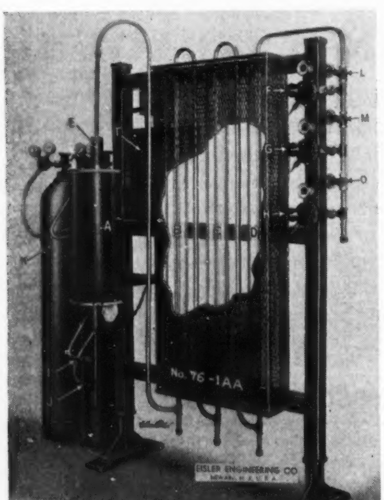
NEW EQUIPMENT

Hydrogen Gas Purifier

QC318

Removing residual oxygen, moisture, and other active contaminating gases from commercial hydrogen, is not only essential for many technological and chemical processes, but also sometimes a fundamental factor. For instance: To prevent oxidation in steel-heating furnaces; to reduce all metallic parts in the production of electronic tubes; to weld or braze metals in an atmosphere of pure hydrogen and also for hydrogenation in various food industries.

The accompanying illustration shows an electric hydrogen gas purifying unit which is manufactured and marketed by the Eisler Engineering Co.



The hydrogen gas, to be purified under a pressure of 30 to 50 lb. per square inch, passes first through an electrically heated furnace A, which holds a calorized seamless steel tube E, containing small pieces of pure copper for removing oxygen. Then the gas moves progressively through three glass containers B, C and D—each 4 feet long and 3 inches in diameter—filled with purifying ingredients such as caustic potash or sodium lime. From the last glass tube D, the purified gas enters a manifold with three outlets L, M and O leading to three different supply lines, from where it may be directed to small furnaces or other places where purified hydrogen is required. Each of the supply lines is controlled by one adjustable diaphragm reducing valve F, G and H providing a possible reduction of pressure down to ½ pound per square inch.

The electric oven A operates on 110 or 220 volts. An auto transformer T is provided for regulating the heat, which never should be over a maximum of 1200° F. Best results are reported at 980° F. Under this temperature and the forementioned pressure, the clarifying materials react rapidly and the complete removal of all extraneous substances in the commercial hydrogen gas is promptly assured.

Two steel cylinders K containing the hydrogen gas under high pressure are supplied to maintain continuous work. Both are independently connected through two flexible metal hoses I and J and a brass pipe line to the electric furnace.

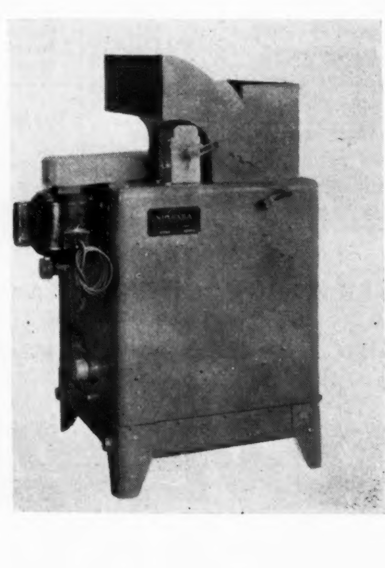
All parts of the equipment are mounted on a frame of heavy square steel tubing. Removable caps on top and base of the glass dryers permit easy filling with chemicals and occasional cleaning of these containers without any trouble.

Air and Gas Cooler

QC319

Equipment for the cooling of compressed air is important because it results in drier air and prevents water damage to pneumatic equipment such as rapid wearing out of parts because of washing out of lubricants, freezing up of pneumatic tools. Dry air also minimizes damage to work by water in paint spray and rusting of metallic shot in blast cleaning equipment.

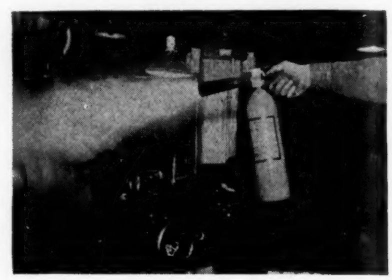
With these facts in mind the Niagara Blower Co. has developed a new Aero After Cooler for compressed air. The unit uses the evaporative cooling principle to obtain the lower temperatures and a new design gives greatly increased capacity in compact apparatus. Air, drawn by a fan through a water spray across coils containing the compressed air is the cooling medium and temperatures within 10° of the wet bulb air temperature can be maintained. This is said to permit lower temperatures by 10° to 25°, than conventional coolers and produces compressed air that contains only one-half to three-fourths the amount of water formerly experienced with the best practice. The equipment is also applied to gases generated for industrial use.



CO_2 Fire Extinguisher

QC320

Speed and maneuverability are all-important in combating the sudden "spot" fires that constantly menace machine shops, production lines, power houses. Keeping these factors in mind, Randolph Laboratories, Inc., has produced a carbon dioxide fire extinguisher that requires only one hand in operation.



"Model FF-4," latest in Randolph's 4 lb. CO_2 series, features a self-aimed, fixed discharge horn, and a thumb-operated trigger valve that releases a penetrating blanket of carbon dioxide.

Self-Priming Pump

QC321

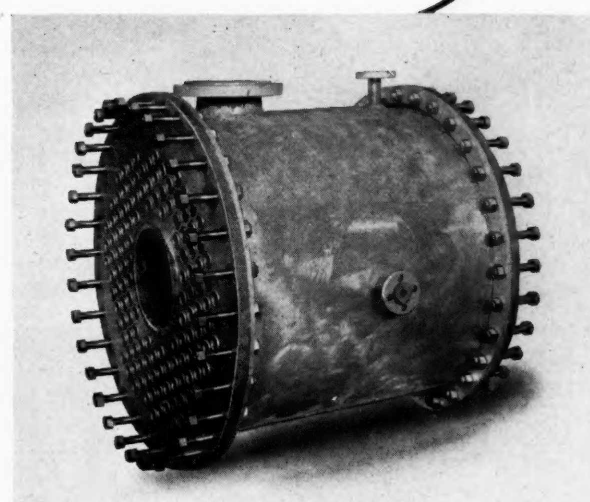
An improved automatically controlled valve is a distinctive feature of the new Type AO self-priming pump announced by Allis-Chalmers Mfg. Co. The design and operation of its valve arrangement is an important factor in the quick and effective self-priming action of this pump.

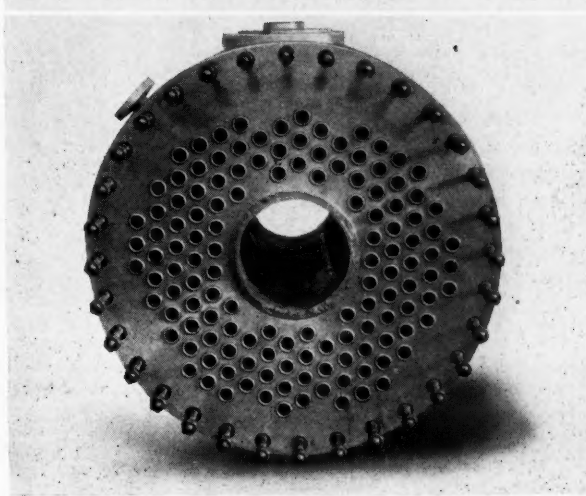
Priming of the Type AO pump is accomplished as the motion of the water throughout the pump runner and the volute passage carries behind it a slug of air, drawing air in the suction passage through the impeller and out through the priming chamber. This hydraulic action lifts the column of water in the suction line and achieves the same results as would a separate vacuum pump. The priming valve closes slowly during this process, acting against a spring tension which governs the rate of priming and the static height of the priming suction lift. The automatic closing of the valve after complete priming prevents water from bypassing back to the suction chamber, with resultant power loss.

The pump impeller has an unusually thick vane with rounded inlet edges, permitting the pump to pass stringy materials and fairly large solids.

Typifying
PATTERSON - KELLEY
Service and Products

A COPPER-SILICON RE-BOILER





It's not large — this Re-Boiler — as measured by many jobs going through our shop but it called for some nice engineering and careful construction. Note particularly the workmanship of the beaded tube ends.

This Re-Boiler provides adequate evidence of the ability of Patterson-Kelley engineers to design processing vessels of special corrosion resisting metals and the ability of shopmen to construct these vessels.

Indeed, it typifies the service Patterson-Kelley can render the process industries on any and all types of pressure vessels, heat exchangers, stills, kettles, cookers, dryers, condensers, towers and tanks.

A letter or call to our nearest office will bring prompt response. To conserve time and travel, outline your problem as fully as possible.

Design statistics include:
Copper-silicon tubes, tube heads and center draft tube. Van Stone flange connections; Alloy-Steel bolts. Flange diameter 48"; length 50".

EST. 1880

THE PATTERSON-KELLEY Company, Inc.

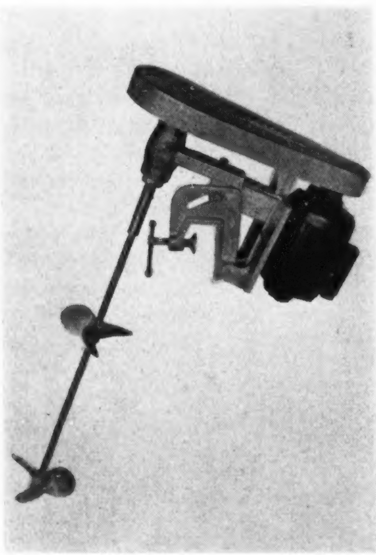
Main Office and Factory **112 WARREN STREET, EAST STROUDSBURG, PA.**

BOSTON 16, 96-A Huntington Avenue • NEW YORK 17, 101 Park Avenue • PHILADELPHIA 3, 1700 Walnut Street • CHICAGO 4, Railway Exchange Building

Allis-Chalmers plans a complete line of the self-priming Type AO pump, from 1 to 6 inch size, although only 2 inch and 3 inch sizes are ready for immediate sale. The entire line of pumps will range from a very small capacity to 1400 gpm and up to heads of 100 feet or over. The self-priming device incorporated in these pumps is also adaptable to use with other pumps, particularly the single suction type.

Portable Mixer QC322

A new belt type portable industrial mixer, in which the motor hangs outside the tank and out of the path of destructive mixing fumes, is the development of United Electric Motor Co. Designed so that the balanced hanger carries the weight of the unit below the center of gravity, the United Mixer needs no tension on the clamp to hold the mixer in place.



Either AC or DC low cost motors may be used, and precise best-mixing speeds, impossible with fixed speed geared-in-head type motors, are obtained by simple pulley changes. Belts and pulleys in the United Mixer are V-type and are readily interchangeable for low or high speed mixing.

When mixing such materials as syrup or wax, the protective belt slipping can be arranged to prevent motor burnouts when viscosity increases. United Mixer's low speed and large propellers increase mixing speed by allowing heavy liquids sufficient time to flow into propellers. Pockets are prevented; air, which might be detrimental to the material cannot be beaten in.

Bearings are combination radial thrust type. Thus both the radial load of the shaft and the thrust encountered in pushing liquids up or down are taken care of. One complete piece, the heavy shaft, combined with the mixer's slow speed and rigid coupling allows for longer shaft lengths for deep tanks. Propellers are of the large, slow speed type and are held on the shaft only by set screws. Hence cleaning, removal or replacement is easy.

Grinder Shield QC323

The Boyer-Campbell Co. has announced a newly designed grinder shield that provides properly directed light and protection for the face and eyes from flying particles. The new unit is molded from a high impact resisting, plastic material and is provided with a window of non-shatterable glass. The lamps are of the "bayonet" type, are vibration resisting and are set in flush with the frame.

Insulating Liquid Tester QC324

An improved 30,000-volt portable test set for the convenient and rapid testing of insulating liquids such as oil and Pyranol has been announced by the General Electric Company. The set, designed for indoor service, provides smoothly variable test voltage from 0 to 30,000 volts on single-phase, 115- or 230-volt, 25- or 60-cycle circuits.

This portable tester can be used to advantage in industrial plants, central stations, substations, and wherever frequent oil testing is required, saving both time and expense in checking the proper dielectric strength of insulating liquids.

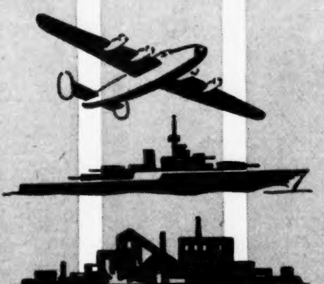
The tester combines in a single unit a step-up transformer, a potentiometer which gradually raises the test voltage, a voltmeter to measure breakdown values, an automatic circuit breaker, and an oil testing receptacle. The control panel is inclined toward the operator, enabling him to read the voltmeter easily and accurately. As soon as the test sample breaks down, the low-voltage breaker automatically opens the circuit, preventing continuation of the arc and burning of the electrodes. Complete instructions for operation are included on the surface of the control panel. The oil testing receptacle is located at the rear of the control panel under a hinged safety guard with a glass window.

The equipment, enclosed in an attractively styled steel case, weighs 80 lb. A hinged cover protects the control equipment and testing receptacle.

Pressure Pumps QC325

Western Machinery Company has developed the Wemco Pressure Diaphragm Pump which it claims is a distinctly new design. This unit adds the feature of pressure head discharge to the advantages of the conventional type of diaphragm pump. Pressure head may be obtained up to 25 pounds per square inch.

A war Hero to Consider in Your Plans for the Future



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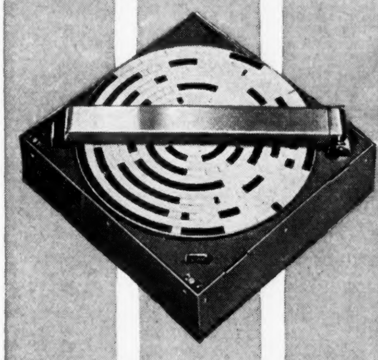

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PACKAGING & SHIPPING

by T. PAT CALLAHAN

Reuse of Containers

Reuse of containers of all kinds was given added impetus during the past month by the Containers Branch of WPB. The Containers Branch conducted clinics throughout the country, wherein the sole topic of discussion was "Reuse of Containers." It is well established that reuse of containers is vitally necessary in order to continue to package materials, and warnings have been issued that if this program is not successful it will be impossible to procure new containers which use critical materials. The chemical industry is cooperating to the fullest extent in this program. Reuse of steel drums, fibre and wood containers, and in some cases multiwall paper bags is being accomplished. By cooperation between manufacturer and customer very sizable savings in actual materials, as well as in stocks of packages in which to put finished goods, are assured.

Reuse of containers particularly reuse of metal drums has been carried out by the chemical industry during the past two years and it is a known fact to the Containers Branch of the WPB that the life of many of these drums is about nearing its end. It has been surprising that these drums have given the service which they have particularly when they have always been referred to as single trip drums, and cases are known wherein these same drums have made as many as eight to ten trips.

Further reuse of drums of this type is out of the question and the Packaging Branch in the Chemicals Division as well as the Container Division of WPB are doing whatever can be done to allocate new drums to replace worn out containers.

Handling Corrosive Liquids

In the Chemical Industry the packing, transporting and handling of acids and other corrosive liquids has always been given a great amount of consideration due to the hazards to individuals who may come in contact with these liquids. Also the Interstate Commerce Commission in order to safeguard other materials in transportation defined acids and other corrosive liquids as follows:

"Acids and other corrosive liquids are strong mineral acids or other corrosive fluids which are liable to cause fire when mixed with chemicals or with organic matter, or are liable, in case of leakage, to damage other freight material."

The Interstate Commerce Commission has also set up specification containers which are the only permissible containers in which these materials can be shipped. Because of the rigid specifications which have been promulgated by the Interstate Commerce Commission it is interesting to note that the report of the Chief Inspector of the Bureau of Explosives shows that in 1942 on all the rails of the United States there were 204 instances of damage in the transportation of acids in all forms of containers. No persons were killed, twenty-one persons were injured and the monetary loss amounted to $53,025.

The Bureau of Explosives has done a remarkable job in the control of acids and other corrosive liquids and it is through their efforts that such a fine report can be issued.

A great amount of educational work in the form of safe development of containers, distribution of safety manuals, adoption of safe handling methods has been done by the various Containers Committees of the Manufacturing Chemists' Association, 608 Woodward Building, Washington, D. C. Chemical shippers of acids and other corrosive fluids, who are not familiar with the work being done by the Manufacturing Chemists' Association, in the preparation and distribution of safety manuals should avail themselves of this fine service, and procure for a nominal sum any number of a dozen good manuals on the handling, shipping, labeling and packaging of. acids and other corrosive liquids.

I.C.C. Regulations Amended

On October 14, 1943, the Interstate Commerce Commission amended the regulations for the transportation of explosives and dangerous articles. We list the more important changes as taken from the order of the Interstate Commerce Commission. One of the most important amendments in this order concerns reused containers and is as follows:

"Amending Par (a), Sec. 28, order Aug. 16, 1940, as follows (reused containers):

"(Add) Note. Because of the present emergency and until further order of the Commission, metal drums not marked to indicate compliance with an I.C.C. specification but otherwise meeting the requirements of containers authorized may be approved by the Bureau of Explosives for service and appropriate specification marking. Application for such approval must include description of container and details of closure, and be made to the Bureau of Explosives, 30 Vesey Street, New York, 7, N. Y."

This is a very important change in the regulations as heretofore it has been necessary for all metal barrels which were used to ship dangerous articles to have their specification identification marked on them. Now if a metal barrel meets all the requirements of the specification although it is not identified by the Interstate Commerce Commission marking it can be used for the shipment of dangerous articles.

An amendment to Sec. 241 of the regulations relating to the transportation of any corrosive liquid in a cargo tank for motor vehicle transportation reads as follows:

"Superseding and amending par. (g), *sec. 241*, order Nov. 8, 1941, to read as follows (*packing-outage corrosive liquids*):

(g) No cargo tank or compartment thereof used for the transportation of any

The editors take pleasure this month in introducing T. Pat Callahan, Supervisor of Containers for Monsanto Chemical Company, who will henceforth conduct this packaging and shipping column.

"Pat" Callahan, as he is known throughout the industry, is a recognized authority on all types of containers for chemicals. He is chairman of the Carboy Committee of the Manufacturing Chemists' Association and is a member of the Metal Barrels and Drums Committee, the Tank Car Committee, the Poisonous Articles Committee, and the Miscellaneous Packages Committee; reflecting his broad knowledge and experience.

We feel sure that those who follow this column from month to month will soon be numbered among the many who have benefited from the contributions Pat has made in the field of chemical packaging and shipping.

corrosive liquid shall be completely filled; sufficient space, not to exceed 2 per cent, shall be left vacant in every case."

Formerly the regulations stated sufficient space shall be left vacant. In this amendment the amount of vacant space is set at not to exceed 2 per cent.

Thionyl chloride has been added to Sec. 245 as an article which is not exempt from the regulations, and is also added to the list on Sec. 247 (a), making it mandatory to package this material in certain specified containers.

Hydrofluoric acid, anhydrous is permitted to be packaged in specification I.C.C. 105A300 tank cars in addition to I.C.C. 105, 105A500 and ARA-V tank cars which were formerly approved.

A complete copy of the amendments as issued by the Interstate Commerce Commission, effective October 14, 1943, is on file in the office of the Secretary of the Commission at Washington, D. C.

Insecticide Packaging to be Simplified

A proposed simplified practice recommendation for containers and packages for household insecticides of the liquid-spray type has been submitted to the producers of insecticides, the glass container manufacturers and other groups interested for approval or comment, according to an announcement by the Division of Simplified Practice, National Bureau of Standards.

This recommendation was drafted by a committee of the Household and Industrial Insecticide and Disinfectant Manufacturers in line with defense plans to increase output and to assist in the program of the War Production Board to assure equitable distribution of containers for essential uses.

It is estimated that the general adoption of this recommendation, that is, the marketing of household insecticides in the standard round pint bottles, instead of the 6-ounce size, should result in a saving of approximately 19% of the glass now used. Also it is estimated that the saving in metal caps, through the use of the pints instead of the 6-ounce bottles, will be approximately 54%. There will also be an appreciable saving in soda ash, corrugated shipping cases and shipping space.

Mimeographed copies of the proposed simplified practice recommendation may be obtained upon request to the Division of Simplified Practice, National Bureau of Standards, U. S. Department of Commerce, Washington 25, D. C.

Paper Sack Order Revised

In view of the paper shortage the paper and textile bag section of the Containers Division of the WPB has amended and clarified Limitation Order L-279 to make it more practical and workable.

Wet strength paper markings were defined in order to identify this type of paper and aid in sorting papers in salvage work. After December 1, 1943, all wet strength paper used in the manufacture of single wall, duplex and multi-wall paper shipping sacks must be distinctly colored, stained or printed or marked with longitudinal stripes spaced not less than 2 inches nor more than 10 inches across the width of the paper. The stripes are required to be not less than $\frac{1}{8}$ inch in width. No other grade of paper used in the manufacture of such shipping sacks may be so marked. The new requirements do not affect any stocks in hand and ready for use as of October 27, 1943.

Other changes in the order included the elimination of former paragraph (E) since its restrictions affecting Schedule I were obsolete, and the extension of the restrictions covering the use of paper shipping sacks for shipping over 50 pounds of cereal products as well as flour. The use of 70-pound paper has been added to those types permitted in manufacturing multi-wall sacks, but paper quality specifications were eliminated because they were found impracticable.

Glass Container Quotas Changed

In an amendment to Supplementary Order L-103-b, issued November 1, the Containers Division of the War Production Board has made minor revisions of new glass container quotas for commercial use. The expiration date of Order L-103-b has been extended to December 31, 1943. It is expected that by this time a permanent order covering glass containers can be issued. In the present amendment methods of computing quotas have been arranged to adapt them to the new six-month quota period, July 1 to December 31, 1943. In addition to regular quotas it is possible for commercial users to borrow in the month of December, 1943, an additional 1/6 of his quota, not to be used before January 1, 1944.

This amendment changes the scope of the order from containers of less than 5-gallon capacity to containers under 2-gallon capacity. It also raises the maximum exemption figure for small users of glass containers from $1,000 to $1,500.

Haulage Order Revised

In an amendment to Haulage Order TR-2 the Chemicals Branch of the WPB has added five additional products in the chemical field to the list of commodities. These additional products are adhesives, butadiene, charcoal, phthalic anhydride, and styrene. Order TR-2 permits manufacturers and shippers to enter into reciprocal arrangements for the common use of transportation and storage of about sixty-one specified commodities.

Wirebound Box Price Increase

To cover increased production costs and at the same time maintain output, increases of 13 percent in ceiling prices for industrial wirebound boxes made in the North, and of 15 percent in the South, were announced recently by the Office of Price Administration.

The new prices are established for each manufacturer on the basis of his March 1-December 31, 1942, f.o.b. factory prices plus a percentage addition of 13 percent in the North and of 15 percent in the South to cover increased costs.

For pricing purposes, a Northern and a Southern zone are established.

The Northern Zone, or Zone 1, is made up of the States north of and including Virginia, Kentucky and Missouri; and east of and including Missouri, Iowa and Minnesota.

The Southern Zone, or Zone 2, is the remainder of the United States.

Special Container Ratings Permitted

War Production Board Preference Rating P-89 was amended October 29, 1943, to permit users to apply for special ratings. Section (f) of this amendment reads as follows:

"(f) *Special preference ratings for containers.* Any producer may apply to the War Production Board, Chemicals Division, Washington 25, D. C., Ref: Chemicals Packaging Section, for special preference ratings under this order for containers and container parts, other than wooden or fibre containers as defined in Preference Rating Order P-140, or steel shipping drums *as defined in Limitation Order L197.*

"The application shall be filed by letter in duplicate or by telegram and shall specify:

"1. Product to be packaged.
2. *Plant location and P-89 serial number.*
3. Number of containers requested.
4. Specification of containers.
5. Other sizes of containers used to package the product.
6. Average number of containers shipped per month (of the size ordered).
7. What substitute containers have been used or could be used.
8. Inventory position of the requested containers, including both new and used containers, and those out on deposit.
9. Name of container supplier and applicant's order number.
10. Total value.
11. Rating requested.
12. Delivery date promised by supplier on the basis of rating requested."

Wooden Container Use Limited

Wooden containers may not be used for the shipment of a large number of products and may be used only to a limited extent for a number of other products, including some fruits and vegetables, according to an amendment to Limitation Order L-232 issued by the War Production Board.

The containers division points out that this action is necessary because of the critical supply situation on raw materials, such as lumber, veneer and plywood, which are used in the manufacture of wooden containers.

PLANT OPERATIONS NOTEBOOK

Maintenance of Electric Furnaces

THESE maintenance recommendations apply to electric furnaces in general. Such recommendations should be incorporated in individual maintenance programs to meet the requirements of each particular furnace. Since furnaces are individually designed for specific applications, the instruction book supplied by the manufacturer of the particular equipment should be consulted.

To best safeguard against interrupted operation, the following conditions should prevail:

1. Operator should become familiar with the operation of the furnace so that he can make all the necessary routine inspections.
2. Spare parts according to list supplied by manufacturer should be carried in stock so that necessary repairs can be made quickly.
3. A routine inspection schedule should be maintained.

Preventive Maintenance Inspection Schedule

This following schedule of what to inspect and what to inspect for may be varied depending on conditions, such as furnace temperature, type of furnace and importance of continuous service.

Every Shift

Control instruments: Correct temperature settings for material to be heated. Visual check of proper functioning of mechanical parts and pointers, and electric devices.

Thermocouples: Make sure they are in operating condition and also that they are in proper location for the work being treated.

General control: Check signal and electronic devices. Clean sight glasses for photoelectric control (electric eyes) and radiation thermocouples.

Doors: Check to see that doors fit properly to prevent excessive loss of heat of furnace atmosphere.

Cooling water: Test water temperature, and make visual checks of flow at discharge.

Gas atmosphere: Check flow. Check analysis.

Quench and coolers: Check temperature and flow of coolant.

Bearings: Check temperature. Check for excessive vibration. Check water flow on water-cooled bearings.

Interior metal parts—hearth plates, conveyors, supports, etc.: Make sure alloy castings are in proper location. Check for presence of excessive warping.

Every Week

Heating unit terminals: Check for evidence of overheating. Check connections to make sure they are tight.

Stuffing boxes: See that they are gastight.

Heating units: Check for evidence of "hot spots," warping, and position of supports.

Thermocouples and control instruments: Check thermocouple condition for excessive oxidation or breakage. Check accuracy of thermocouple by means of an optical unit or additional thermocouple.

Mechanisms—conveyors, roll drives, pushers, drive belts, chains, etc.: General inspection for proper functioning.

Circulating pumps: Check for excessive vibration. Check pressure and flow. Check packing for evidence of leaks.

Contractor: Check for excessive pitting and vibration.

Every 6 Months (or when furnace is shut down)

Heating units: Examine for excessive corrosion or warping. Renew portions of unit or complete unit if required. Replace broken hanger blocks, resistor supports, and hanger hooks.

Thermocouples and control instruments: Check thermocouples and replace if not in good condition. Check instrument according to manufacturer's instruction.

General control: Examine temperature-limit fuses, replace with spare link if necessary. Inspect contactors, and clean or renew. Inspect electronic devices.

Mechanisms—conveyors, roll drives, pushers, drive belts, chains, etc.: Check for excessive play and for evidence of worn parts. Check condition of drive belts and chains.

Interior metal parts—hearth plates, rolls, supports, etc.: Check all heat-resisting metal parts for cracks, warping, sagging or misplacement.

Brickwork: Check general condition of arch, plumbness of walls, evidence of expansion cracks, line-up of piers.

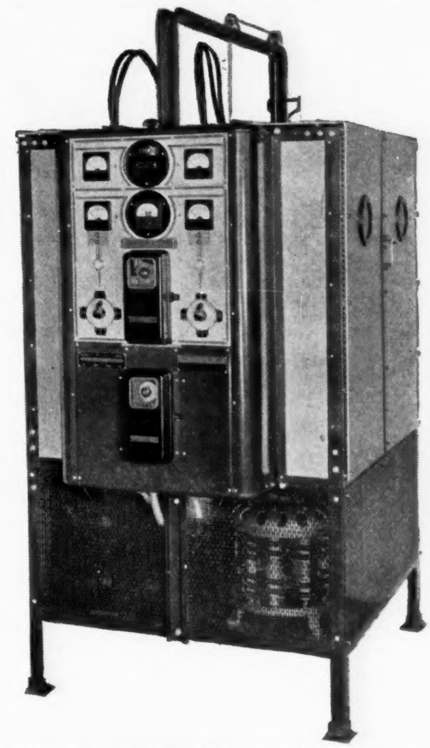
Condensed from a booklet entitled, "How to Maintain Electric Furnaces" published by the General Electric Company.

TROUBLE-SHOOTING CHART

Trouble	Cause	Remedy
Improper operating temperature.	Failure of thermocouple or temperature-limiting fuse blown.	Remove and replace with spare thermocouple or spare fuse. When radiation-type head is used, a dirty sight glass may be the cause of the trouble. Clean and replace.
	Failure of control instrument.	See manufacturer's instructions for correction of control instrument trouble.
	Failure of control devices or wiring.	Clean or renew pitted or sticky contactor, and make sure that all parts operate freely. Open circuits should be located and repaired.
	Open circuit in heating chamber.	The open circuit may be within the furnace.
	Excessive atmosphere leakage.	Doors may not be seating properly. Make adjustments as required. Tighten or repack stuffing boxes. Where processed atmosphere is used, make sure it does not enter so as to directly strike the thermocouple or the charge. If this happens, change the inlet of the atmosphere. Consult the company representative if condition is difficult.
Failure of heating unit.	Corrosion of unit. Foreign material dropping on unit.	Heating unit badly corroded or burned should be replaced with new material. Burned-out spots may be repaired by welding.

Weathering effects on materials accurately reproduced in the laboratory

ATLAS TWIN-ARC WEATHER-OMETER

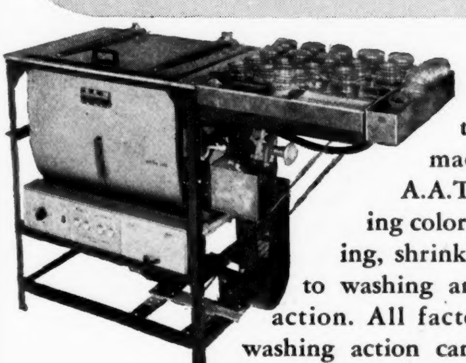


Faithfully duplicates the combined weathering effects of sunlight, rain, heavy dew and thermal shock; accelerated to reduce years of actual weathering to a few days of testing.

The new Twin-Arc Weather-Ometer is equipped to take large size specimens in order to meet the new Federal Specifications demanding accelerated weathering tests. Full automatic control of light and water periods is provided by the Atlas cycle timer unit, which can be set to meet standard and special requirements of weathering tests. A direct reading thermal regulator, automatic shut-off switch and a running time meter is included as standard equipment. After setting exposure cycles on the control panel the Weather-Ometer can be safely left in continuous operation over night without attention except to replace carbons once in 24 hours.

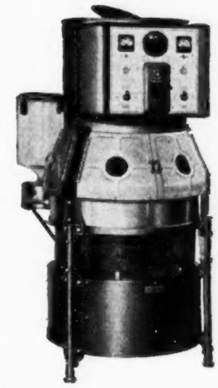
The Atlas Weather-Ometer proves the durability of materials under exact conditions of weathering found in actual use in outdoor exposure.

ATLAS LAUNDER-OMETER



The standard laboratory washing machine of the A.A.T.C.C. for testing color fastness, staining, shrinking, resistance to washing and mechanical action. All factors including washing action can be carefully controlled and reproduced identically at any time. The new preheating loading table, increases accuracy of tests by starting all samples at uniform temperature.

ATLAS FADE-OMETER



The recognized standard testing machine for determining the fastness to light of dyestuffs and dyed fabrics. Specimens are rotated around the Atlas Enclosed Violet Arc—the closest approach to natural sunlight — in masked holders. Automatic temperature control to within $\pm 3°$ F. and humidity regulated by a constant reservoir according to requirements of tests. Operation is completely automatic without attention from operator; can be left in continuous operation overnight.

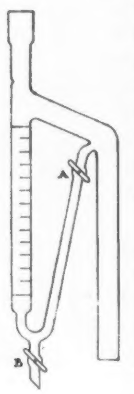
ATLAS ELECTRIC DEVICES CO.
361 W. Superior Street, Chicago 10, Illinois

Originators and sole manufacturers of accelerated testing machines for over a quarter of a century. Weather-Ometer, Fade-Ometer, Launder-Ometer are used all over the world as accepted standard testing machines.

LABORATORY NOTEBOOK

Universal Continuous Decanter

The determination of water by distillation with an immiscible solvent lighter or heavier than water is now possible using the apparatus designed by Karl M. Herstein, of Herstein Labs., Inc., and described in *The Chemist Analyst*. Modifying the A.S.T.M. apparatus for the standard method of test for dilution of crankcase oils, Mr. Herstein has added two stopcocks as shown in the diagram.



With stopcock *A* open this apparatus is usable for its original purpose, the determination of steam-distillable materials in used lubricating oil, and also for the trapping of moisture when a solvent denser than water is used.

To use the apparatus for the determination of water with a light solvent, it is filled with water, stopcock *A* being open, to the level of this cock. Stopcock *A* is then closed and water is drawn off through stopcock *B* to the zero mark of the graduated tube. If more water is obtained than can be read on the scale, stopcock *B* serves to draw off portions of it so that the upper meniscus remains within the scale.

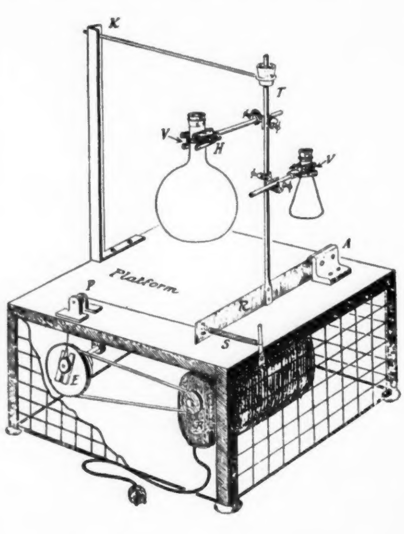
Besides its usefulness in this manner the apparatus may also be employed in organic procedures in which water is driven off and the progress of the reaction is determined by measuring the water.

Vibratory Shaker

If you frequently feel the need for a simple means of shaking small quantities of liquids or suspensions in whatever types of container they may happen to be, *e. g.* bottles, conical flasks, test-tubes, you will be interested in the apparatus described by A. R. Gilson, in *Chemistry and Industry*. The device may also be used to shake liquids and solids in the presence of a gas, as required in low-pressure hydrogenation work.

The shaker consists of a spring steel strip or reed (*R*), approximately 12 in. long by 1½ in. wide by 1/16 in. thick, fixed at one end (*A*), and attached at the other end, on one side, to a tension spring (*S*) and on the other side to a wire cable from an adjustable eccentric (*E*). A ½-in. diameter rod (*T*), approximately 9 in. long, is riveted to the center of the reed and projects upwards in a vertical position. It is clamped at the top end, through a rubber bush and a metal rod, to the stabilising structure (*K*).

The driving motor (*B*), 1/16—⅛ h.p., is bolted firmly to the underside of the platform and can be of the universal variable-speed or single-phase constant-speed type. In the former case, the eccentric (*E*) is mounted directly on the motor shaft, thus simplifying construction. In the latter case, the eccentric is integral with a suitable stepped pulley and is mounted separately in a plain bearing attached to the underside of the platform. It is then operated by means of a short V-belt drive from the motor (as shown in the illustration). The Bowden wire cable which connects the eccentric to the reed passes over a pulley (*P*). In operation, the lateral vibratory movement imparted to the end of reed (*R*) by means of the eccentric sets up a similar vibratory movement in the vertical rod (*T*) and



this vibration is transmitted to whatever is attached to the rod. When mounted on rubber feet, the device is silent in operation.

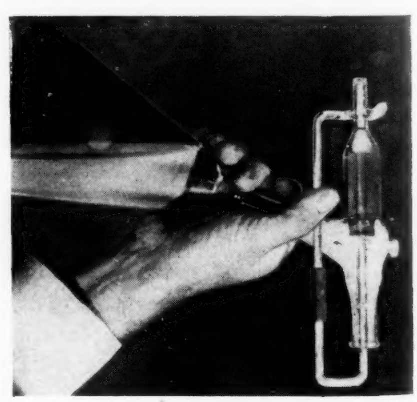
Containers which, within reasonable limits, can be of any shape and size up to about 1000 c.c. and of which there can be any number, up to the capacity of the vertical rod (*T*), are clamped to it by means of special V clamps and ordinary boss heads—preferably of the accurate angle type, the containers themselves being firmly held in the jaws of the clamps by means of strong rubber bands or springs fastened to the hooks (*H*). The clamps, with the containers attached, are then orientated with respect to each other, and to rod *T*, so as to give the desired degree of agitation. This can be varied by altering (*a*) the speed of the motor by means of a suitable rheostat, or gearing, as the case may be, the optimum speed range being 600 to 1000 r.p.m., and (*b*) the throw of the eccentric, the optimum throw being about ¼ in. Once the optimum conditions under (*a*) and (*b*) have been established, however, it is seldom necessary to do more than vary the orientation of the V clamps with respect to rod (*T*) and the reed, to achieve any desired degree of agitation.

For maximum efficiency with this particular size of shaker, vessels used as containers (when dealing with quantities of liquid of the order of 20 c.c. and over), should be three to four times the volume of the liquid contained. In the case of heavy suspensions, flat-bottomed vessels are preferable.

According to Mr. Gilson, efficient shaking is achieved with a surprisingly small amplitude and consequently with a minimum of splashing. Therefore, it can be used in many operations where heretofore hand shaking had to be relied upon. Moreover because of the small movement of the container, shaking at elevated temperatures can be accomplished by surrounding the vessel with an electrically heated air oven.

Rapid Pipetting

Battery reactions are said to be made faster and more accurately with this "automatic" pipette than with the conventional type. The measuring chamber is filled (slightly to overflowing) by tilting the flask to pouring position. When flask is returned to vertical, the surplus drains back, leaving the chamber with a predetermined volume. Its content is let into the beaker by raising the plunger-lever with the thumb (see illustration) or by engaging the ring-hook with the far rim of the beaker and pressing downwards. Dispenser assemblies



may be had for pipetted quantities from 5 to 100 cc, each dispenser operating with flasks holding 250, 500, 1000, 1500 or 2000 cc. Special combinations are also available from the manufacturer, Macalaster Bicknell Company.

INDUSTRY'S BOOKSHELF

Technology of Spectra

CHEMICAL SPECTROSCOPY, 2nd edition, by *Wallace R. Brode*. John Wiley & Sons, Inc., N. Y.; 1943, 677 pp., $6.50. Reviewed by *Prof. Raymond T. Ellickson*. Polytechnic Institute of Brooklyn.

INTENDED TO SERVE two purposes, this book is a text for a course in chemical spectroscopy for advanced undergraduate students, and a reference book for workers in the field of chemical spectroscopy.

About half of the book is devoted to a description of spectroscopic apparatus and its use in qualitative and quantitative analysis. This is followed by a set of twelve experiments that have evidently been chosen from those used in the highly successful course in chemical spectroscopy given by the author. The last third of the book consists of various tables that are useful in this field.

The small part of the book that is devoted to the theory of spectra will be quite incomprehensible to those who are being introduced to the subject for the first time and of little value to those who are already familiar with the subject. This, of course, is to be expected, since the book is intended to serve as a guide for those interested in the practical side of spectroscopy. As such a guide this book is an excellent one and certainly should be a part of the library of any organization that does, or is planning to do, work in spectroscopy. The section on absorption spectra and its connection with molecular structure is especially well done. The chapters on dark room equipment and practice, and on the equipment and arrangement of a spectrographic laboratory will be of special value to those who are starting work in spectroscopy for the first time.

As might be expected in a first printing, there are some annoying typographical errors. The statement that "a succeedingly greater voltage energy is required to produce a higher degree of ionization" would scarcely be considered good usage by most physicists.

Perhaps the most valuable feature of the book is the great attention given to spectrographic apparatus of all kinds. The book is profusely illustrated with both photographs and line drawings, all of which are well done. A complete and well chosen bibliography to the entire field of spectroscopy is included. Professor Brode has done a real service in writing and revising this book; it should do a great deal toward accelerating the already rapid movement toward the use of spectrographic methods in chemistry.

Essential Reference

HANDBOOK OF PLASTICS, by *Herbert R. Simonds, Carleton Ellis,* and *M. H. Bigelow.* D. Van Nostrand Co., Inc., N. Y.; 1943, 1083 pp., $10.00. Reviewed by *George Lubin,* materials engineer.

PROBABLY the most exhaustive and comprehensive treatise written to date on the subject of technology of the plastics industry, the amount of detailed information presented in this handbook was heretofore never collected in one volume. The list of authors and collaborators reads like "Who is Who in Plastics."

The authors first give the reader an introduction to the history and the scope of the industry including statistics on the manufacture and distribution of natural and synthetic resins. The next section contains the description of the physical properties of various plastics and allied materials. In addition there is a useful innovation—a chapter on plastics catalogues in which are listed condensed excerpts and tables of properties from the catalogues of the leading manufacturers of molding powders and synthetic resins. This chapter will prove to be of value to prospective users of these materials.

The sections on the manufacture of basic plastics and their subsequent processing and fabrication contain numerous flow charts and detailed diagrams. The chapters on handling of materials and lists of manufacturers of every type of equipment and machinery are particularly useful.

There is also a section on the chemistry of plastics and the complete schematic analysis of different basic resins. Probably the most technical part of the book, this is not recommended for laymen.

The section on application of plastics and mold design includes many present and proposed uses with tables of best suited materials for each use. The chapters on the design of molded parts and on mold design are among the best and most complete treatises written on these subjects.

The book is well written and the physical make-up is excellent. The authors' style of writing and the choice of type combine to make the text easy reading. The presentation of information is effective, and the numerous indexes, glossaries and cross-references make this information easily accessible. The handbook will prove a most valuable addition to any plastics library.

Preparation of Compounds

ORGANIC SYNTHESES, VOL. 23, *L. I. Smith,* editor. John Wiley & Sons, Inc., N. Y., 1943. 124 pp., $1.75.

SYNTHESES included are: acetylbenzoyl; alloxan; alloxantin dihydrate; bromoacetal; 3-bromo-4-hydroxytoluene; carbobenzoxy chloride and derivatives; 1,1-cyclobutanedicarboxylic acid and cyclobutanecarboxylic acid; cyclopropyl cyanide; *beta*-di-*n*-butylaminooethylamine; 2-3 dihydropyrane; *beta, beta*-dimethylacrylic acid; *beta*-dimethylaminopropiophenone hydrochloride; *beta*-ethoxyethyl bromide; *beta*-ethyloxypropionitrile; ethyl benzoylacetate; ethyl bromoacetate; indole; ketene diethylacetal; mandelic acid; *l*-menthoxyacetic acid; *l*-menthoxyacetyl chloride; mesitaldehyde; *beta*-methylglutaric acid; *beta*-naphthaldehyde; *p*-nitrobenzoyl peroxide; pentamethylene bromide; *a*-phenylethylamine; *beta*-phenylethylamine; phthalaldehydic acid; pseudoionone; 1-(*a*-pyridyl)-2-propanol *trans*-stilbene; tetrahydrofurfuryl bromide; tetrahydropyrane; tetraphenylcyclopentadienone; tetraphenylphthalic anhydride; tribiphenylcarbinol; triphenylcarbinol; triphenylchoromethane.

Formula Handbook

THE CHEMICAL FORMULARY, Vol. VI, *H. Bennett,* editor-in-chief. Chemical Publishing Co., Inc., N. Y.; 1943, 635 pp., $6.00.

SIXTH VOLUME of this standby contains additional new formulae, thus bringing up-to-date the contents of the five previous books. Practical formulae in the fields of adhesives; beverages; cosmetics and drugs; emulsions; farm and garden specialties; food products; hides, leather and fur; inks and marking materials; lubricants and oils; materials of construction; metals, alloys and their treatment; paint, varnish, lacquer and other coatings; paper; photography, polishes and abrasives; pyrotechnics and explosives; rubber, resins, plastics and waxes; soaps and cleaners; textiles and fibers; and miscellaneous.

An innovation in the new volume is a chapter on substitutes for scarce materials.

BOOKLETS & CATALOGS

Chemicals

Finishes for all types of equipment—paints, synthetics, and lacquers—are reported in an interesting, non-technical article in the Sept.-Oct. issue of *The Du Pont Magazine*. On metal planes, finishes inhibit corrosion and control visibility; in airplane fabrics, they draw the cloth taut, produce an air-tight film, and protect the cloth from the elements; on plywood planes, highly-impermeable sealing coats inhibit swelling, shrinking and warping. Further uses of finishes by the various branches of the military forces and in war production are also reviewed. Other articles in the publication summarize the applications of nylon as a plastic and describe the production of more electrotypes per pound of copper. E. I. du Pont de Nemours & Co., Inc. A584.

Lead-base Alloys to replace tin-base alloys are briefly described in the Sept. issue of *Lead*. A table lists some of the lead-base bearing alloys, their composition, Brinell hardness, melting ranges, and pouring temperatures. As a corrosion resistant coating on iron and steel, lead is now being used for hot-dip lead-coated steel sheets, according to another item in the issue. Illustrated with photographs. Lead Industries Ass'n. A585.

Paints. The result of laboratory investigations, Booklet A-3860 examines the relationships in hiding power and brightness which exist between rutile and anatase titanium pigments and their relative economy in resin emulsion paints. Ten clear, full-page charts show rutile vs. anatase titanium dioxide with respect to brightness; dry and wet hiding; saving through replacement of anatase by rutile; and the merits of water-dispersive rutile and anatase in comparison with normal grades of these pigments. E. I. du Pont de Nemours & Co., Inc. A586.

"The Pioneer," Sept. issue, reports on reclamation of sewage by-products, a butanol-glycerine mixture that is a good soap solvent, and the use of caustic soda to produce a blood plasma substitute and, from sawdust and sulfur, a dye solution. Niagara Alkali Co. A587.

Plastics. Bulletin No. 20, Vol. 5, details the physical properties of new heat-resistant Lucite. This is a molded methyl methacrylate thermoplastic with increased heat stability, which can be used where a material of lower heat distortion point is impractical. However, it is not recommended for articles which are to be subjected to boiling or to temperatures in excess of 200° F. Leaflet is illustrated with photographs and graphs showing the effect of boiling water and dry oven heat. E. I. du Pont de Nemours & Co. A588.

Plexiglas, Mechanical Properties. Second in a series covering the properties of Plexiglas, this technical booklet includes details of test methods, results, and applications of these properties. Covered are specific gravity, scratch resistance, indentation resistance, rebound efficiency, abrasion resistance, impact strength, tensile strength, flexural strength, compressive strength, sheer strength, and pinload bearing strength. Effect of temperature, thickness, size and shape, conditioning rate of straining, and other factors on strength are charted. An appendix contains optical, electrical, and chemical properties. Complete with illustrations and technical tables, the 91-page engineering bulletin will aid in the use of Plexiglas. Available on request on company letterhead to Rohm & Haas Co., Washington Sq., Philadelphia, Pa.

Equipment—Containers

Boiler Feed Water Equipment. Proportioning sulfuric acid to water supplies is described in Publication 2985-A. According to the 4-page bulletin, accuracy is obtained without the use of any moving parts in contact with the corrosive liquid, thus giving long life and low maintenance charges. Principle of operation, advantages and applications are included. Illustrated with diagramatical sketches of the air-actuated proportioner and typical installations. Cochrane Corp. F2.

Draft Control Device which operates by barometric pressure and automatically compensates for variations in outside temperature, pressures, wind velocity and direction, is reported in 16-page Bulletin No. 800A. Graph shows relation between CO_2 and preventable fuel losses. Preferred Utilities Co., Inc. F3.

Electronic Heating for high-speed brazing, hardening, annealing, and soldering applied to steel, copper, aluminum, magnesium, brass, nickel, and other metals is briefly discussed in the third quarter of *Electric Heat in Industry*. Another report describes the electric immersion heating of soft metals with the Calrod heater which is not available for use in new equipment, but can be applied to fuel-fired apparatus already installed. Special feature of the issue is the Midget-heater Maintenance Chart which lists various troubles, analyzes their causes, and suggests remedies. Illustrated with schematic diagrams showing the correct and incorrect methods of solving maintenance problems. General Electric Co. F4.

Fiberglas. Samples of the basic fibers of this glass are contained in a folder which allows visual and tactile comparison. The fibers range from long silky staples to short crimped ends. A graph shows the relation of tensile strength to fiber diameter. The various physical properties of the fibers are also compared in a table. Owen-Corning Fiberglas Corp. F5.

Laboratory Appliances for holding, clamping, and supporting apparatus in the laboratory are catalogued in 20-page booklet, attractively printed and illustrated. Castaloy is a non-ferrous alloy that does not rust and resists corrosion by laboratory fumes. The equipment illustrated, described and priced includes burette supports, extension clamps, clamp holders, utility clamps, leveling bulb support, pinch and hose cocks, special titration aids, and flexaframe connectors. Fisher Scientific Co. F6.

CHEMICAL INDUSTRIES·TECHNICAL DATA SERVICE

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I would like to receive the following booklets or catalogs.

A584	A587	F2	F5
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BETWEEN THE LINES

Congress on Aluminum

Good bauxite reserves in this country are estimated at 6,000,000 to 8,500,000 tons, as against current consumption of about 7,000,000 tons annually, much of which is imported. Does this call for more intensive development of domestic clays and other low grade sources, asks Congress? The situation is viewed by some as another evidence of need for more government research.

THE OFFICIAL attitude as to production and supply of aluminum is once again being challenged, though not necessarily from an authoritative direction. The challenge comes from members of Congress representing states in which supplementary mineral sources are either present in some quantities, or the members hope that with sufficient government pressure, will be found and developed. In aluminum they see a product which may call for such development.

Currently the approved picture of the aluminum situation is this:

The position of aluminum has now become such as to permit much wider use of the metal than was the case when in January of last year strict controls were established which confined its use to only the most essential war and civilian needs. There have been successive relaxations of controls down to the present.

Recent further modifications under these changed conditions allow the metal for data and instruction plates of specified thickness, bus bars—for which at one time it became advisable to dip into Treasury stocks of hoarded silver—bare electrical conductors and current-carrying accessories.

In addition to a number of other such uses, the relaxed controls now permit aluminum to be used in galvanizing baths, in manufacture of aluminum bottom boards for foundry processes, for certain jigs and fixtures in aircraft production, coils and fins in refrigeration equipment, and several other items hitherto barred from the former limited stocks.

At a cost of more than a billion dollars, of which 80 per cent was from Federal sources, aluminum production has been increased to 700 per cent of the 1939 figure, and magnesium, incidentally, about 560 per cent.

Unofficial production estimates on aluminum show 1,250,000 tons for this year. The highest production prior to the war is given as 200,000 tons per year. Recently Charles E. Wilson, executive vice chairman of War Production Board, informed some members of Congress, "We have so much aluminum that it is running out of our ears."

Current large production figures however, fail to tell the whole story in the opinion of the Congressional elements mentioned here. One spokesman for this group declared, in fact, "No matter whose set of figures is used, it is evident that the vital problem of a future supply of aluminum has been and is being shockingly mishandled."

It is rather difficult to understand what is meant, if one accepts the official picture, when these same members further describe the situation as "the present critical state" of the nation's aluminum supply. This view suggests more lengthy examination to see what is behind it.

The present method of producing metallic aluminum consists of subjecting the ore, bauxite, to a series of mechanical, chemical and electrolytic operations. Bauxite is found in this country in substantial quantities, and also in certain off-shore areas, including Dutch Guiana, off the north coast of South Africa.

Without bauxite, obviously, plants depending on this ore are useless in production of aluminum. This is the keynote of those factions in Congress and out, who take issue with the present representation as to the national aluminum supply. Is there enough bauxite? If not, then the country had better start developing other minerals and clays as substitute ore sources.

Estimates of remaining bauxite deposits in this country vary: typical figures on high-grade ore are as low as 6,000,000 tons and up to 8,500,000 tons. American plants are adapted to this grade of ore, and it has been estimated they are using 7,000,000 tons annually. These figures are purposely taken from the "opposition" so to speak, since we are now exploring their viewpoint. On this basis, they maintain, bauxite ore remaining in this country is enough for about two years.

Bureau of Mines explorations are reported to have located about 6,000,000 tons, though not described as all high-grade. Counting ths added bauxite supply however, the opposition concedes there might be enough for 3 years, although it is pointed out that processes for using such ore, defined as containing more than 8 per cent silica, are not yet completely successful. Other complications reported are that the new ores are much deeper in the ground, and would require a lengthy period of preliminary work for their use.

In other words, the industry on its present scale, is dependent on the ore fleet. A considerable part of the bauxite ore now used in both this country's plants and those operated in Canada, is said to be imported. Once the major deposits in this country, largely in Arkansas, are exhausted, it is argued, the American aluminum industry will be dependent on foreign sources, mainly Dutch Guiana. Hence, according to this side of the discussion, it is imperative to develop those clays and other domestic minerals which offer possibilities as substitute ore sources. It is possible, so runs this argument, to develop alumina from aluminum-bearing clays found in various parts of the country "in unlimited quantities."

A determined effort has been made in the past, and from present indications is about to be revived, to have such experimental uses pushed by official agencies. The processes for such clays are known to such agencies as WPB and the Bureau of Mines, as well as the Aluminum Company, which is to be expected, of course. The Bureau of Mines does have two basic processes under more or less continuous study. There is no guarantee from such study so far that either will work for industrial purposes.

Engineering and mechanical problems are to be expected. In fact, three large-scale pilot plants have now been cut off from further experiment for the time, through WPB cancellation of materials. One such plant was first proposed in March, 1941, for extraction of alumina from alunite, found in Utah. At the time the aluminum supply was a much different matter from what it is today, and the Bureau of Mines reported favorably on the idea.

Subsequently it was reported that plans were being laid for expansion of alumina production in Dutch Guiana. Incidentally bauxite in that area is under monopoly control. This year, however, three new processes for development of alumina from clay received approval of the National Academy of Sciences, which action covered proposals for three pilot plants—one in the South, one in Wyoming, and one in the Pacific Northwest. These are the plants which have been halted.

(Turn to page 752)

 Prepared Monthly by U. S. Industrial Chemicals, Inc.

U.S.I. CHEMICAL NEWS

November ★ A Monthly Series for Chemists and Executives of the Solvents and Chemical Consuming Industries ★ 1943

Sodium Ethoxide Uses Widen in Making War-Essential Drugs

Key Reactions Depend upon Product made Available by U.S.I.

Production of atebrin, the vitally-needed substitute for quinine, as well as of vitamin B_1 and sulfadiazine have tremendously increased the importance of Claisen Condensation reactions. As a result, demand for sodium ethoxide to serve as the condensing agent has multiplied rapidly.

In the preparation of atebrin, sodium ethoxide is used to condense the diethyl amino ethyl chloride with ethyl acetoacetate to form the side chain. In the synthesis of vitamin B_1, sodium ethoxide is required for the condensations of two intermediates: aceto butyrolactone and sodium formyl beta ethoxy ethyl propionate. For sulfadiazine, sodium ethoxide is used with ethyl acetate and ethyl formate to give ethyl sodium formyl acetate.

The Claisen Condensation type of reaction, using sodium ethoxide, can best be illustrated by the preparation of ethyl acetoacetate from ethyl acetate, in which the reaction is:

$$2\ CH_3COOC_2H_5 + C_2H_5O\,Na \longrightarrow CH_3C(ONa)\ CH\ COOC_2H_5 + C_2H_5OH$$

(Neutralization of the ethyl sodium acetoacetate gives ethyl acetoacetate.)

These uses for sodium ethoxide may well represent only the beginning. For with the ever-widening possibilities for commercial-scale production of complex organic synthetics, increasing use of Claisen Condensation reactions is bound to be made. Particularly will this be true when such products as ethyl sodium acetone oxalate, acetyl acetone, and aceto butyrolactone become available commercially.

Sodium ethoxide is now supplied by U.S.I. in an alcohol solution known as Anhydrous S.D. 2B, modified with sodium.

Recovers Alcohol, Acetone By Solvent Extraction

An economical new process is reported for recovering low-boiling alcohols, ketones, aldehydes, etc., particularly from aqueous solutions of less than 5% strength. The process has been shown, experimentally, to require less heat and to permit recovery of many liquids from solutions too dilute to be handled otherwise. It involves solvent extraction, followed by distillation of the extract layer to give the organic liquid overhead.

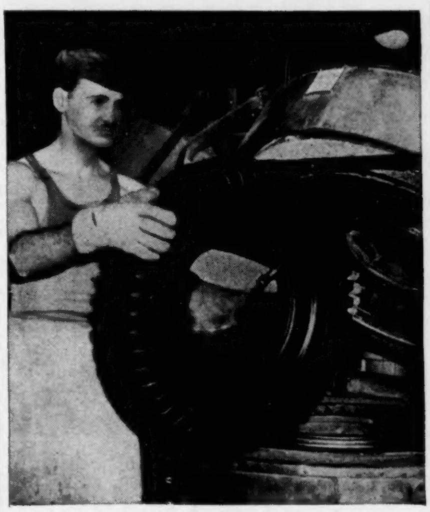
Revised Folder on U.S.I. Products

A new descriptive folder listing U.S.I. products and their more common uses is now available upon request.

Synthetic Rubber Takes Big Tonnage of 'Secondary' Chemicals

Many Important Applications of Chemicals Other than Butadiene and Styrene Described

The current Government program calls for the annual production of 850,000 long tons of synthetic rubbers: 735,000 tons of GR-S (Buna S); 75,000 tons of GR-I (Butyl); and 40,000 tons of GR-M (Neoprene). In addition, smaller amounts of Buna N, Chemigum, Hycar, Koroseal and Thiokol are being manufactured by private companies. Aside from the chief constituents—butadiene, styrene, isobutylene, isoprene, and chloroprene—many other chemicals are required, and although their proportions are small, the total amounts are great. In the processing of the synthetic rubbers, moreover, still other substances are needed; some of these are the same as those used in processing natural rubber, but in greater proportions; some are quite different. The total amounts of all these "secondary" chemicals reach staggering figures.



A synthetic "first". . . with millions more to come

Inorganic and Organic

These additional chemicals are both inorganic and organic. Large amounts of alum and soda ash, for example, are required to soften the water used in the polymerization process; sodium metaphosphate is used for preventing corrosion in pumps, pipe lines and tanks; chlorine is employed to keep down slime formation in apparatus; anhydrous ammonia and brine are necessary to furnish refrigeration; tons of rock salt and much sulfuric acid are used in solution to precipitate or coagulate the synthetic latex.

Organic stabilizers, little known compounds which prevent the premature polymerization of the butadiene and styrene while in storage, are present in only about two hundredths of one per cent. Yet on the basis of 748,600 tons of butadiene, this small proportion means about 150 tons, or a third of a million pounds. Furthermore, these stabilizing agents must be removed before the material is emulsified, and for this a solution of sodium hydroxide is required.

(*Continued on next page*)

Chemistry at War Keynote of Chemical Show

Highlighting the chemical progress which has been crowded into two years of war, the 19th Exposition of Chemical Industries will concentrate on factual, "show-how" information. It promises a stimulating panorama of recent accomplishments in plant conversion, creation of new products, and high speed transition from test tube to tank car production. Madison Square Garden, New York, Dec. 6 to 11.

One of the new synthetic rubbers, as it emerges on conveyor from the dryer which removes water collected during coagulation.

November ★ U.S.I. CHEMICAL NEWS ★ 1943

Synthetic Rubber Chemicals

(Continued from preceding page)

The emulsification of the butadiene and styrene requires great quantities of soap, pure sodium stearate. The plants are designed to use soap itself or to make the soap from stearic acid and sodium hydroxide. The polymerization catalyst is added to the emulsified materials, and later a reaction stopper or anti-polymerizing agent is used to arrest the polymerization at the proper stage. (This reaction stopper may be an antioxidant and therefore serve a dual purpose.)

Larger proportions of softeners are generally required in GR-S than in natural rubber. If at least five per cent of a softener is used in every GR-S compound, the total amount would be 36,750 tons or somewhat over 82,000,000 pounds! Softeners must be cheap and the important ones come from coal tar and turpentine products. High-boiling esters such, for example, as dibutyl phthalate, dibutyl sebacate, etc., are in favor in the processing of some of the synthetic rubber compounds.

Accelerators

Organic accelerators are important in the vulcanization of GR-S compounds, as with natural rubber. There are variations in the effects obtained, but mercaptobenzothiazole is the leader in both cases. Tetramethylthiuram-mono-sulfide and mercaptothiazoline are also useful. The aldehyde-amine type of accelerator, like the butyraldehyde condensation product with aniline, acts best as a secondary accelerator to "boost" the action of those just mentioned. From 1.0 to 1.5 parts are generally used to 100 of the synthetic rubber. On the basis of 735,000 tons of GR-S, one per cent means 7,350 tons of accelerators.

In the manufacture of Butyl rubber, boiling ethylene is used to refrigerate the reaction mixture. The manufacture of Buna-N requires sodium oleate as the emulsifier, salt for the coagulation, and antioxidants for stopping the polymerization. Furthermore, reclaimed rubber is closely connected with the entire program and the amount now being made is almost double the pre-war production. Here caustic soda and oils from the coal and pine tar industries are widely used.

"Research is the price of progress," and surely at this time, with the wonderful cooperation of rubber chemists and engineers in the great synthetic rubber program, we can expect marvelous advances in rubber technology, and the application of many new chemicals to make the synthetic rubber do even more than natural rubber could do.

Continuous Process Recovers Coating Materials from Water

DETROIT, Mich. — A method for recovering and reconditioning the excess sprayed coating material picked up by spray-booth water has been patented by two inventors here.

The water-contaminated solids are dissolved in a solvent having a lower boiling point than water, and of the same kind as that normally used in applying the coating material. The mixture is then distilled under vacuum, at a temperature below the boiling point of water. The distillate is condensed, and the solvent returned to the solution of coating material solids. Portions of the solution of water-free coating materials are periodically removed, and water-contaminated solids are added, without interrupting the process.

Industry Increases Use of Special Liquid Curbay

Widely used as an extender for molasses in dairy and hog feeds, U.S.I.'s Special Liquid Curbay is finding increasing industrial use as a binder — in foundry core and molding sands, in briquetting, in thickening agents, in impregnating paper. Available in tank-car quantities without allocation limitations, it is handled just like molasses in storage or mixing equipment.

New Glass Cleaner Patented

A patent has been granted for a glass cleaner consisting of an aqueous solution of 20 to 50% methyl, ethyl, or propyl alcohol in which 0.02 to 0.2% tetra sodium (or potassium) pyrophosphate is added to prevent haze formation.

Produces Lower Alkyl Ethers of Methylolurea

Announcement is made of a patent covering the treatment of dimethylolurea with methyl, ethyl, propyl, or butyl alcohol. The reaction is carried out at a pH of at least 9.0 until an ether of a methylolurea is formed, and then terminated prior to resinification. Termination of the reaction is effected by removal of the ether from the alkaline solution, as by chilling.

TECHNICAL DEVELOPMENTS

Further information on these items may be obtained by writing to U.S.I.

Electrically-conductive rubber, originally developed for de-icing aircraft propellers, is finding use in explosives manufacture to eliminate the hazard of static electricity and replace former non-ferrous metals subject to corrosion. Resistance of the new rubber is said to run as low as 5,000 to 10,000 ohms per centimeter cube. **(No. 749)**

U S I

A new paint vehicle, combining drying, high thinner tolerance and compatibility wtih most resins is announced. The product is said to possess all the best qualities of linseed oil, plus some desirable new properties, and to allow greater production on limited oil quotas. **(No. 750)**

U S I

A synthetic filter cloth, which the maker reports to be highly resistant to both strong acids and alkalis, is facilitating many continuous filtering operations in the synthetic rubber, explosives, and petroleum industries. **(No. 751)**

U S I

A substitute for morphine, which has been under chemical tests for three years, is now being made generally available to the medical profession. **(No. 752)**

U S I

Resiliency measurements, important to manufacturers and consumers of rubber and other extensible materials, is facilitated by a new instrument which measures the rebound of a weighted plunger dropped from a predetermined height. **(No. 753)**

U S I

A new insulating glass, suitable for ovens and furnaces as well as for towers, tanks, etc., is announced. Of low heat conductivity due to its cellular structure, the glass is said to be fire and vapor-proof and impervious to moisture. **(No. 754)**

U S I

Sealing the seams of bolted tanks used to store gasoline and other fuels is possible with a new synthetic rubber compound which comes in strip form. The strip is claimed to be so flexible it can be wound, at minus 70°F., on a 1/2-in. rod without cracking. **(No. 755)**

U S I

A new spray-degreasing booth, reported by the manufacturer to hold losses of war-scarce solvents to new low figures, is announced. **(No. 756)**

U S I

Pecan shell oil is now being offered for sale in large quantities. Said to be the equal of olive oil for table use, it is also useful in the making of dyes and high-grade soaps. **(No. 757)**

U S I

A new adhesive said to be both thermoplastic and thermo-setting is reported in use in the production of plywood for military helicopters. The new material is stated to set in 20 minutes, as a permanently tough, heat-resistant, insoluble bond which will withstand three hours of boiling in water. **(No. 758)**

CANADIAN REVIEW

by W. A. JORDAN

Production Leveling Off

Some evidence of "tapering off" in productive operations has been apparent in recent months, and although the manufacturing index for the first eight months of the year, based on 100 for 1935-39, stands at 288.5 against 233.6 for the corresponding period of 1942, the comparative month to month increase has been at a progressively lower rate.

W. A. Jordan

The production of chemicals during September, exclusive of Government war plants, was up a single point over August, and six points over September of last year. Exact figures are not available for Government chemical and explosive operations, but it is understood that the peak has been passed and some adjustment of producing facilities is under way.

Steel production is double that of 1939, with alloy output quintupled, to rank the Dominion as fourth steel producing nation of the world. In spite of gold mining decreases, mineral production is up 24 per cent over last year, pulp and paper output has improved slightly, and the textile industry has recovered fractionally in the last month.

Prospects for the two large chemical consuming industries, pulp and paper, and textiles, are not too bright. Both are seriously affected by manpower shortages, reflected in the former by a short cut of 1,250,000 cords of pulpwood and in the latter by an anticipated 15 to 20 per cent decreased labor force within the next six months.

ZnO_2 Restrictions Eased

Restrictions on the use of zinc oxide have been eased recently to raise paint manufacturers' quotas from 50 to 65 per cent of 1940 consumption, and to permit use of zinc oxide in cosmetics for the first time since 1941. The latter industry is now allowed 50 per cent of its 1940 oxide requirements.

The bulk of Canadian zinc oxide is manufactured from domestically produced electrolytic zinc, 95 per cent of which last year went to essential civilian and war use. In mid 1941 paint manufacturers were instructed to revise all formulae to eliminate zinc oxide as completely as possible, and Government paint specifications were adjusted accordingly.

In 1940 the paint industry consumed 1,650 tons of the oxide, rubber processors some 5,200 tons, whereas cosmetic requirements did not exceed 50 tons.

Steel Slag as Fertilizer

In keeping with the urgent demand for increased agricultural production, particularly in the Maritime provinces where a minimum rail haul is required for delivery to Eastern ports, the National Research Council and Department of Agriculture, have been conducting extensive investigations on processes to enhance the fertilizing value of phosphatic open hearth slag.

Special attention is being paid to the 150,000 tons of 10 to 12 per cent P_2O_5 slag produced annually by the Dominion Steel and Coal Co., Nova Scotia, for it contains more phosphate than is used annually in all the Maritimes, lime equivalent to two or three times the agricultural consumption of ground limestone in the same area, as well as smaller quantities of manganese, magnesia, sulfur, iron, and minor elements of which deficiencies exist in some soils. Successful utilization of this heretofore waste slag would be of paramount importance to the over-cropped, under-fertilized Maritimes.

Carbide Absorbs Bakelite

Bakelite Corporation of Canada Ltd. has transferred all its assets and business to its affiliated company, Carbide and Carbon Chemicals Ltd., which in turn is a wholly owned subsidiary of Union Carbide and Carbon. Henceforth the company will operate as Carbide and Carbon Chemicals, Bakelite Plastic Division.

U. C. C. is also joint owner of the other major plastic producer, Canadian Resins and Chemicals Ltd., sole Canadian manufacturer of polyvinyl acetate and chloride resins.

Canadian Rubber

The first Buna S synthetic rubber to be manufactured in Canada was produced recently by Polymer Corp. from Canadian styrene and butadiene imported from the U. S. A. Although styrene has been produced, and exported, by this Crown company for several months, it is not anticipated that the petroleum-base butadiene unit will be in operation much before the end of the year.

The plant has a rated annual capacity of 34,000 tons of Buna S and 8000 tons of butyl rubber, a tonnage roughly equivalent to normal Canadian rubber requirements.

Talc by Flotation

A flotation process devised by the Bureau of Mines renders possible the beneficiation of domestic Madoc talc, so that it can be used in the manufacture of steatite insulators for high frequency radio purposes.

The Madoc talc, which is of good white color, has been mined for 40 years, but run-of-the-mill quality has been such as to confine its use to other industrial applications.

The new process yields a beneficiated talc which is soft, non-abrasive, and highly refractory. It fires to a pure white color, and possesses high dielectric properties in insulator body formulations.

Paper Chemicals' Use Up

The pulp and paper industry, Canada's number one manufacturing activity, consumed $17,500,000 worth of chemicals during 1942, up $300,000 over the preceding year, according to preliminary statistics just released. Gross value of output for the industry totalled $337,000,000, up 0.9 per cent over 1941, and 38.3 per cent over 1929.

The major chemical purchase of the industry was 211,000 tons of sulfur, primarily American, valued at $5,700,000. Domestically produced lime, chlorine, and salt cake were all in the million dollar bracket.

Blood Substitute

Experiments have been under way in Canada for several years designed to develop a suitable blood substitute for transfusion use and shock treatment. A recent announcement states that isinglass, commonly known as fish gelatin, appears to be a safe and effective transfusion material.

Research workers have checked a number of chemicals, such as pectin, cellulose, polyvinyl alcohol, nylon, and other substances which give non-toxic, colloidal, aqueous solutions, but isinglass, when properly prepared, is most satisfactory.

In that the supply of raw material is virtually unlimited, and can be processed cheaply on a large scale, this development may permit the establishment of reserves of artificial transfusion material to cope with wartime emergencies.

NEWS OF THE MONTH

A.I.Ch.E. Discusses War and Postwar

Chemical engineers at Thirty-Sixth Annual Meeting told to expect 20 to 40 per cent employment increase over prewar level. George Granger Brown elected president.

THE ANNUAL meeting of the American Institute of Chemical Engineers at Pittsburgh, November 15-16, was told by P. W. Meyeringh, vice-president of the Hercules Powder Co., that a majority of the country's industrial concerns are expecting an increase of 20 to 40 per cent in employment after the war.

Mr. Meyeringh recalled the "inferiority complex" of industry resulting from the depression of the thirties and how at the outset of the war it "threw off its inertia and almost overnight performed a miracle of production and a miracle of employment." Speaking of the unemployment problem, he said, "It has been stated that if we had employed every one of the 10,000,000 unemployed during the period of 1930 to 1940, we would have added to the nation's income an amount of at least $200,000,000,000, which incidentally is almost equal to the amount which we expect to spend on this war."

George Granger Brown, professor of chemical engineering and chairman of the Department of Chemical and Metallurgical Engineering of the University of Michigan, was elected president of the institute for the year 1944. Professor Brown succeeds J. L. Bennett, manager, Chemical Operations, Explosives Department, Hercules Powder Co. Dr. L. W. Bass, director of the New England Industrial Research Foundation, was elected vice-president for the same period.

The following directors were elected for terms of three years each: W. I. Burt, B. F. Goodrich Co.; J. C. Lawrence, E. I. duPont de Nemours & Co.; W. T. Nichols, Westvaco Chlorine Products Co.; and D. E. Pierce, General Aniline Works. F. J. Curtis, Monsanto Chemical Co. was re-elected for one year.

According to a report made by the Technical Manpower Committee of the institute, the chemical industries of the United States will have only half the number of newly graduated chemical engineers this year as compared with prewar, and a crisis is rapidly approaching in the long time supply of these trained men. The committee based its conclusions on a survey of 77 colleges and universities and found that there were only 1500 senior students of chemical engineering who will graduate by June 1, 1944. This compares with about 3000 seniors for last February.

G. G. Brown, new president of A. I. Ch. E.

The history of the development of hydrogen fluoride alkylation, a process now making a petroleum blend which is a major ingredient in high octane gasoline, was described by H. J. Nebeck of Universal Oil Products Co. Though the basic chemistry was discovered and understood a decade ago, the commercial development had to wait, first on unprecedented demand for aviation fuel, and secondly, on discovery of safety measures for handling hydrogen fluoride, which is the catalyst and one of the most dangerous chemicals in the whole field of chemistry. Ordinarily kept in wax or lead bottles, hydrogen fluoride is corrosive to all metals and even glass and the safety hazard presented an extreme obstacle to its commercial use. Fortunately, concentrated hydrogen fluoride used in the alkylation process, is not corrosive to steel and this fact solved the problem of what to use as a material of construction in commercial plants.

Among the developments discussed at the meeting was a new distillation column designed by engineers of United Gas Improvement Co. as an aid to the high temperature oil cracking process. According to E. H. Smoker, as unsaturated hydrocarbons polymerize in conventional distillation equipment, it was necessary to develop a new batch distillation still having high efficiencies.

The new distillation column consists of 5 identical 30" diameter sections, each containing seven 8" steel tubes. The hot vapors from the heated oil mixtures rise through the open spaces between sections, while the condensed vapors are collected at the bottom of the individual tubes. As part of the development, the engineers devised a new control for the column. By use of an instrument which measures the pressure drop of the hot vapors ascending the column, the flow of steam heat is regulated and efficiency maintained.

At the business session, the proposed revision of the constitution was referred back to committee for further minor changes and clarifications. Acting upon a suggestion from the floor, the president appointed a committee to follow Washington legislation affecting the chemical engineering profession. A. E. Marshall, Rumford Chemical Co., was named chairman of this committee, with members consisting of G. G. Brown, University of Michigan; L. W. Bass, New England Industrial Research Foundation; A. H. Hixson, Columbia University; and H. C. Parmelee, McGraw-Hill Publishing Co.

The meeting attracted a good attendance, registration being second largest in the history of the Institute.

Grebe Receives Medal

The Chemical Industry Medal of the Society of Chemical Industry was presented on November 12 to Dr. John J. Grebe, director, Physical Research Laboratory, Dow Chemical Co., at a joint meeting of the American Section of the Society of Chemical Industry, the New York Section of the American Chemical Society and the New York Section of the American Institute of Chemical Engineers with Dr. Foster Dee Snell presiding. The election of Dr. Grebe to receive the medal, which is awarded for valuable application of chemical research to industry, was in recognition of his contribution to the solution of some of the difficult problems connected with the automatic control of chemical reactions.

Consulting Chemists and Chemical Engineers Elect

New officers of the Association of Consulting Chemists and Chemical Engineers, Inc., were elected at the group's annual meeting in October. Left to right, they are H. M. Shields, Mid-Town Coal Laboratories, treasurer; H. P. Trevithick, New York Produce Exchange, president; A. P. Sachs, consultant, vice-president. The new secretary is W. C. Bowden, Jr., Ledoux & Co.

Alcohol Demands Rise

Estimates of industrial alcohol supplies and requirements for 1943 and 1944 have been presented to Senator Gillette's Committee on Utilization of Farm Crops by Walter G. Whitman, assistant director, Chemicals Division, WPB.

Production plus a small amount of imports is estimated at 450 million gallons in 1943 and 590 million in 1944. Requirements are figured as 410 million gallons in 1943 and 640 million in 1944. The increase in 1944 is due to the synthetic rubber program, which is estimated to need 130 million gallons in 1943 and 330 million gallons in 1944, corresponding to one-half of the alcohol usage next year.

Government stocks, which reached a peak of nearly 140 million gallons at the end of last July, had been reduced to 120 million gallons by the end of September. New alcohol plants and expansions of existing plants which are under construction are expected to be completed this winter and to contribute over 60 million gallons to next year's supply. These plants at full operation have a combined capacity of about 80 million gallons.

Containers' Re-use Urged

With production of all types of containers running between 15 and 25% behind consumption demands, E. F. Tomiska, chief of the container division, War Production Board, warned that the extent to which the agency will issue further orders curtailing the use of containers will be determined by the economies effected by business and industry through the reuse of such packaging.

Alien Patents Abstracted

The chemical patents and patent applications vested by the Alien Property Custodian have been abstracted by the Chicago Section, American Chemical Society and are now being indexed by a committee of the Science and Technology Group, Special Libraries Ass'n. Beginning in January, 1944, these abstracts will be published in 31 classified, indexed pamphlets, to be followed by a master index and a supplement of new abstracts. The prices, if demand is adequate to justify them, will be $1.00 for any booklet and $25.00 for all 33 booklets. The paper situation necessitates close adjustment of the printing to the known demand; orders should be placed not later than December 10 to make sure of receiving copies. Order blanks may be had from Alien Property Custodian, Field Bldg., Chicago 3, Illinois.

Safety Shortage

There just isn't enough industrial safety equipment available to meet current war-expanded demands.

WPB suggests all possible repairs to present equipment in an effort to spread protection as widely as possible while shortages exist, and is urging industry not to overbuy or hoard safety devices.

WPB's survey showed the following per capita amounts spent by the major manufacturing industries for safety equipment in 1942.

Chemicals	$6.00
Merchant ships	5.75
Aircraft mfg.	5.22
Iron and steel	5.11
Mining	4.53
Stone, clay, glass	4.40
Petroleum	3.98
Machinery, not transportation	3.50
Paper	3.19
Lumber	1.93
Rubber	1.76
Food	1.75
Construction	.97
Textile	.91
Public utilities	.75
Tanning, leather	.61

New Research Laboratory of Pennsylvania Salt

Palatial Whitemarsh Hall, former Philadelphia residence of the late Edward T. Stotesbury, will be the new home of the research and development department of Pennsylvania Salt Manufacturing Co. The mansion's 150 rooms will be altered to make laboratory space for about 75 chemists and their assistants.

COMPANIES

Koppers Acquires Firm

All physical assets of Coated Products Corp., of Verona, Pa., have been purchased by Koppers Co., and the business will continue in operation without interruption as the Coated Products Division of Koppers Co.

Acquired by Koppers through this transaction are all rights in the Plastipitch process of weather proofing and corrosion proofing of prefabricated metals and steel shapes. Morton I. Dorfan, formerly associated with the corporation, has been appointed manager of the new Koppers division created by the transfer. The purchase does not include acquisition of any of the stock of Coated Products Corp. nor the assumption by Koppers of any of its liabilities.

Pool Resin Facilities

Three companies, Continental Can Co., Inc., Swedlow Aeroplastic Corp., and Marco Chemicals, Inc., have agreed to pool their knowledge and facilities to make airplane parts from the new MR-type synthetic resins, according to an official announcement. The finished product is a laminated fiber-resin composition made with paper, cotton cloth, glass cloth, asbestos and wood veneer, in which the strength properties can be controlled by varying the nature of the fiber.

Glass Co. Elects President

Formerly vice-president and director of research and development for the Hartford-Empire Co., Dr. J. C. Hostetter has been appointed president of the Mississippi Glass Co. Several years ago Dr. Hostetter was awarded the Howard N. Potts Medal by the Franklin Institute for supervising the pouring of the world's largest reflecting telescope mirror now in Mt. Palomar Observatory.

Shell Chemical Merges

Shell Chemical Co. and its parent corporation, Shell Union Oil Corp. merged October 3. Shell Chemical will be operated as a division of Shell Union. J. Oostermeyer has been elected executive vice-president of the Shell Chemical Division, W. P. Gage and L. V. Steck vice-presidents, and E. Reillac assistant secretary and assistant treasurer.

Thermoid Buys Company

Thermoid Co. has acquired the Joseph Stokes Rubber Co. in Trenton and its subsidiary in Welland, Ontario, Canada. These purchases will make Thermoid's combined sales for the year 1943 exceed $19,000,000.

As many of the products manufactured by Joseph Stokes Rubber Co. can be sold by Thermoid's industrial Rubber Products Division, it is expected that the sales administration of Stokes will be supervised by Thermoid. W. J. B. Stokes II will remain as president of Stokes, devoting most of his time to manufacturing and engineering problems in that factory. No change in the sales methods of Joseph Stokes Rubber Co., Ltd., of Canada are contemplated.

Plexiglas Name Extended

Rohm & Haas Co., manufacturers of Plexiglas acrylic resin sheets and rods,

has announced that their molding materials formerly known as Crystalite, will henceforth be called "Plexiglas Molding Powders." Because the name Plexiglas has become known through its use on aircraft for transparent streamlined bomber noses, turrets and domes, and since the molding powders are made from the same basic raw materials, the change is being made in the interests of clarity and simplification.

Antrim Iron To Move

After having operated at Antrim, Mich., since 1886, the Antrim Iron Co. has now terminated its blast furnace and wood chemical production. However the saw mill operations will continue to complete the cutting of the remaining stand of virgin timber. This action is due primarily to a shortage of manpower in the woods necessary to put up the chemical cordwood on which operations depend. The plant facilities may be moved to Mexico and South America.

Tanning Company Expands

Arthur C. Trask Co. recently acquired 70,000 sq. ft. of land located near their plant in Chicago. At present a warehouse building has been erected on the site, and later, when conditions make it feasible, the company plans to build a new factory there.

The following companies have recently been awarded the Army-Navy "E" for excellence in production of war materials.

- American Foundry Equipment Co., Mishawaka, Ind.—White star added to flag.
- Henry K. Davies & Co., Inc., South Kearny Plant, South Kearny, N. J.
- Du Pont de Nemours & Co., Inc., E. I., Plastics Dept. Plant, Arlington, N. J.
- Du Pont de Nemours & Co., Inc., E. I., Photo Products Dept., Parlin, N. J.
- Farrel-Birmingham Co., Inc., Ansonia, Conn.—Third star added to flag.
- B. F. Goodrich Co., Oaks Division, Oaks, Pa.
- Hercules Powder Co., Mansfield Plant, Mansfield, Mass.
- International Minerals and Chemical Corp., Magnesium Division, Austin, Tex.
- Link Belt Co., Caldwell Plant, Chicago, Ill.
- Mathieson Alkali Works, Inc., Niagara Falls Plant, Niagara Falls, N. Y.—Star added to flag.
- Thomas Truck & Caster Co., Keokuk, Iowa.

Promotions in Organic Chemicals Division of Monsanto

Edward J. DePree, left, manager of the John F. Queeny St. Louis plant, was made assistant to the general manager of the division. Manager of the Monsanto, Ill., operations, William G. Krummrich, center, was promoted to division production manager in charge of the Monsanto, Ill., Chemical Warfare Service St. Louis plants and the Monsanto synthetic rubber raw material plant at Texas City. B. E. Thomas, right, manufacturing superintendent of the Queeny plant, was promoted to division production manager in charge of operations of the Queeny plant and the Nitro and Norfolk plants.

PERSONNEL

Newcomers at Gas Institute

Barbara Hopkins, Lawrence C. Bischmann, and John C. Kalbach have recently joined the staff of the Institute of Gas Technology.

Miss Hopkins has come from the library of the *Chicago Tribune* to assume the duties of librarian at the institute. Previously she was assistant librarian at the University of Detroit.

Mr. Bischmann, analytical chemist, formerly associated with the Public Service Company of Northern Illinois and with the Universal Oil Products Company, is now a member of the institute's staff.

Mr. Kalbach will coordinate research and development activities in the field of gaseous reactions. As senior supervisor at the Plum Brook Ordnance Works of the Trojan Powder Company he recently completed participation in the establishment of new productive facilities for explosives.

New Girdler Vice-President

For the last five years sales manager of the Votator division of Girdler Corp., John E. Slaughter, Jr., was recently elected a vice-president.

Carman Leaves WPB

Frank H. Carman will assume the position of general manager of Plastics Materials Manufacturers' Ass'n., Washington, D. C., effective January 1, 1944. Mr. Carman has been with WPB in Washington since 1941. Originally appointed to handle the allocation of neoprene, he was responsible for allocations of all synthetic rubbers and vinyl polymers until August 1943. During this time Mr. Carman devoted considerable time to his work as technical consultant for Chemicals & Allied Products Branch, working with the Coordinator for Rubber of WPB and the Rubber Reserve Co. Prior to the appointment of the Rubber Director he handled all details connected with the synthetic rubber program for WPB. In August 1942 Mr. Carman was appointed Chief of Plastics Section in the Chemicals Division. Before his Washington affiliation he was with Armstrong Cork Co.

Penn Salt Additions

Appointments to the Research and Development Department Staff of the Pennsylvania Salt Manufacuring Company include J. Grant-Mackay, formerly with Jefferson Island Salt Mining Co.; Francis E. Murphy, formerly with General Chemical Co.; Dr. Herbert E. Ricks, formerly with Gutham Radio Co.; W. C. Wolfe, formerly with Petroleum Chemicals, Inc.; and Alfred H. Pope, formerly with General Chemical Defense Corp.

In addition to the above, Dr. S. C. Ogburn states that a number of recent college graduates have been added to his staff including William K. Conn, Haverford College; James H. Koob, LaSalle College; Lester S. Verdelli, Ursinus College; Anne M. Buchy, Chestnut Hill College; and Evelyn C. Sisson, Indiana University.

New Assignments in B. F. Goodrich Company.
William S. Richardson, left, has been named head of the newly-created chemicals division. Mr. Richards entered the rubber industry in 1914 and joined B. F. Goodrich in 1926 on the staff of the assistant works manager. E. F. Tomlinson, center, has been made general manager of the company's industrial products sales division. He has been a member of the B. F. Goodrich Company since 1927 in various capacities. Arthur Kelly, right, with B. F. Goodrich since 1925, has been appointed assistant works manager.

Hooker Promotions and Appointments

The Hooker Electrochemical Co. has announced the following promotions and new appointments in its Sales Department: Robert E. Wilkin, formerly assistant sales manager for Organic Products, appointed eastern sales manager; Dr. Lauren B. Hitchcock, consulting chemical engineer at Hooker since 1935, appointed manager of sales development; Samuel I. Anderson, midwestern sales representative since 1933, now assistant eastern sales manager; Stanley F. M. Maclaren, research staff member since 1929, appointed assistant eastern sales manager.

Other new appointments include G. F. Reale, formerly assistant sales manager in charge of heavy chemicals at Hooker, now special sales supervisor; William F. George, formerly on the Hooker staff and later with CHEMICAL INDUSTRIES Magazine, rejoined Hooker Co. and is now New York District sales supervisor; William H. Monsson, with Hooker's sales organi-

Tri-Sure News

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BALI

"When the Japs overran Java"..

From "We Were There"
An Autobiography of the Tri-Sure Family

Balinese Boy

As each told of an adventure or experience in some remote part of the world, the minds of some lived again those times when they were called upon to do the job for which they were made.

"That reminds me of when the Japs overran Java," a cousin of mine took up the story.

"Our planes had been ground strafing everything they could find. Nine had left the field in the afternoon and at dusk only eight had returned. The pilots were quiet and solemn at the scanty mess that night. The following day they were moving out, rumor had it, to Bali or to Australia.

"Early the next morning orders came to move all aircraft to a temporary field on the Island of Soembawa. As much equipment as possible was piled into the airplanes and, with the ground crews aboard, they took off one by one for the new field.

"The Commanding Officer was the first to land and immediately a tent was pitched to act as headquarters. One by one the planes arrived. Unconsciously he counted them—5, 6, 7, 8—all in. Then his nerves taughtened as another plane roared over the field. He knew it was not a Jap by the sound of the engine. Running outside, he saw a plane coming in to land. He looked along the line of machines in front of the improvised hangar. There were 8. Turning his gaze to the landing machine he read the number on the tail. It was the machine that had failed to return the previous day.

"It taxied up into line with the others; the engine stopped, and the crew got out. The Commanding Officer shook hands with the pilot and asked where he had been.

"The story was that they had run short of fuel and had been forced to land on the beach in South Java. There they had found a number of gasoline drums washed up on the beach, evidently from a torpedoed supply ship. An examination found them to be full of aviation gasoline. Since it was too late to take off that evening, they had hidden the aircraft with the branches of trees and foliage, refueling their tanks from the salvaged drums during the night. In the morning they had taken off and returned to the field just in time to see the last machine taking off for the new field, so they had tagged along."

Thanks to the airtight seals on the drums found in the water, the gasoline was "as specified" and this had saved them.

"A small closure seal had saved a number of lives and a valuable aircraft."

At the conclusion of the story the audience applauded.

Send for De Luxe Bound Copy of "We Were There"

The excerpt above is from "We Were There," a modern odyssey that carries the reader through history-making exploits in Africa, the Pacific, Tunis, the Aleutians, Java and Alaska. It is profusely illustrated with original portraits of Winston Churchill, General Chiang Kai-Shek, General Carl Spaatz, General Sir B. L. Montgomery, Lt. Col. Jimmy Devereux, and pencil studies of natives of Tunisia, the Aleutians and Java. A copy of the De Luxe Edition, beautifully bound, will be sent free upon request. Just mail the coupon.

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zation since 1935, appointed midwestern sales supervisor; George J. Bruyn, formerly assistant to the sales manager, appointed office manager of the Niagara Sales Department.

Mack Leblang, formerly general manager of Hazard Advertising Co., is now assisting the president of Wishnick-Tumpeer, Inc., **Robert I. Wishnick,** in the execution of the company's long range program of product research and manufacturing. The product and institutional advertising of the company will also be under Mr. Leblang's supervision from the New York office at 295 Madison Avenue.

Chester F. Conner has been named assistant general manager, and **Fred Lang** merchandise manager of Industrial Products Sales Division of The B. F. Goodrich Co. Conner had previously been merchandise manager, Lang, manager of sole and heel sales.

Peyton Hawes, vice-president of McKesson & Robbins, Inc., has been appointed manager of the Portland, Oregon, Division, to succeed the late **Harlan E. Brown** who died suddenly November 5 at his home in Beaverton, Oregon.

Reginald V. Coghlan, formerly assistant general sales manager of Beacon Chemical Corp., Philadelphia, has been named assistant to L. M. Van Riper, vice-president and advertising director of McKesson & Robbins, Inc.

M. G. Huntington is the new assistant manager of B. F. Goodrich National Sales and Service Division in Detroit. Mr. Huntington moves to Detroit from Washington, where he has been in the company's Washington office of the division as manager for the past year. **C. W. Wacker,** a member of the original equipment division for the last five years has also been made an assistant manager. **K. D. Smith,** in Detroit for the past year for the National Sales and Service Division returns to Washington as B. F. Goodrich's manager of Government Sales and Service there.

Appointment of **Milton J. Maguire** as resident manager of the Hercules' Portland, Oregon, office, has been announced by the powder company.

Appointment of **John N. Cronk** as advertising manager has been announced by Commercial Solvents Corp. He will be located at Terre Haute, Indiana. The advertising and promotional activities of the corporation will continue under the general supervision of the Technical Service Division of which **Charles D. Goodale** is manager.

H. M. Gwyn, Jr., has joined the T chnical Division of Attapulgus Clay Co.

Paul J. Weber, economist and head of the Economic Research Department of Hercules Powder Co., was recently elected assistant treasurer at a meeting of the board of directors. Mr. Weber will continue the direction of economic research of the company in addition to his duties as assistant treasurer.

Kelite Products, Inc., has added another chemist, **Lee S. Sinclair, Jr.,** to the laboratory staff at its main plant in Los Angeles.

F. W. Warner is the new assistant engineer of the Plastics Division of General Electric Co. in Pittsfield, Mass. **G. A. Gustafson** has been appointed manufacturing manager of the Plastics Divisions.

The Alco Oil and Chemical Corp., Philadelphia, Pa., announced the appointment of **George C. Graham, Jr.,** as chemist in charge of research and development. Mr. Graham was associated with Rohm and Haas Co.

Robert F. Volentine, most recently with the office of the Alien Property Custodian, has been named assistant foreign sales manager for the Schering Corp., Bloomfield, N. J.

Henry H. Weiskoff, chemical engineer, has become associated with the

Arnesto Paint Co., in charge of technical development and production.

OBITUARIES

Dr. Henry V. Arny, who was professor of chemistry at Columbia from 1911 until his retirement in 1937 and also dean of the university's College of Pharmacy, 1930-37, died after a long illness at his home in Montclair, N. J., Nov. 3d. He was 75 years old.

Philip Berau, former assistant treasurer of the Standard Oil Co. of N. J., died on Oct. 18, after a long illness at his home, 716 Washington Street. He was 67 years old. Mr. Berau was in the employ of Standard Oil for thirty years, retiring six years ago.

Henry J. Boulden of White Plains, N. Y., retired manufacturing superintendent and chemical engineer for the William Waltke Co., died on Oct. 17, at the age of 82.

Harlan E. Brown, 58, for the past six years vice-president and manager of the Portland, Oregon, Division of McKesson & Robbins, Inc., died suddenly, Nov. 5, at his home in Beaverton, Oregon.

Albert Frankel, former treasurer and a director of the Roessler & Hasslacher Chemical Co., died on Oct. 19, of a heart attack at his summer home in Bethel, Conn., at the age of 67. After the merger of the Roessler & Hasslacher Co. with the du Pont Corp. he was manager of the division it formed until his retirement in 1941.

Louis E. Lannan, vice-president of the Pennsylvania Industrial Chemical Corp., died on Oct. 11, in his home in McKeesport. His age was 68.

Edgar V. O'Daniel, vice-president and director of the American Cyanamid Co. and president of its Canadian subsidiary, North American Cyanamid, Ltd., died Nov. 4th in his 60th year. At the time of his death, Mr. O'Daniel was chairman of the Committee on Economic Policy and director of the Chamber of Commerce of U. S. A.; trustee of the National Industrial Conference Board; director of the Commerce and Industry Association of New York.

Earle R. Pickett, former Mayor of Canajoharie and chief chemist for the Beech-Nut Packing Co. since 1929, died Nov. 6 in the Walter Reed Hospital, Washington, at the age of 47. Since September Mr Pickett had been doing special work in Washington for the Quartermaster General of the Army, being on a six months' leave of absence from the Beech-Nut Company. He was credited with the development of special rations for the army.

Jacob J. Ripner, founder and president of the Aluminum Smelting and Refining Co., died in Cleveland, Nov. 6, at the age of 57.

A. Roy Robson, vice-president of Fels & Co., Philadelphia soap manufacturers, died Oct. 28 at his home, Sunnyview Farms, after a long illness. His age was 60. Mr. Robson also was vice-president of the Paschall Oxygen Co. and was a member of the War Production Board's advisory committee for the soap and glycerine industry.

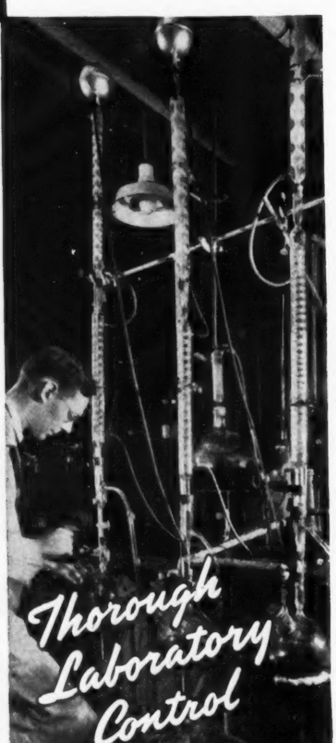
B. Anderson Stigen, manager of the Charlotte branch of the General Dyestuff Corp. of New York, died of a heart attack at his office on Nov. 2. His age was 71.

Clarence B. Taylor, a department head at the Standard Oil Development Co. at Linden with which he was associated for twenty-eight years, died at Elizabeth, N. J., Oct. 10, after a short illness. His age was 58.

NEWS OF SUPPLIERS

AMERICAN BRAKE SHOE CO. has appointed Joseph B. Terbell first vice president of the American Manganese Steel Division.

LINK-BELT CO. has announced the following promotions: Edward J. Burnell, vice president in charge of sales for the entire company, assisted by Nelson L. Davis, sales manager for materials handling machinery; William H. Kinkead, sales manager for power transmission machinery, and C. Walter Spalding, sales manager for power transmission equipment. Also



on the promotion list are Harold L. Hoefman, manager of the Atlanta plant, who succeeds Mr. Burnell as general manager of the Pershing Road plant in Chicago; Richard B. Holmes, manager of the Atlanta plant, to succeed Mr. Hoefman; David E. Davidson, district manager at Indianapolis, to succeed Mr. Holmes. Ray S. Wood is the plant manager of the newly purchased manufacturing plant and inventory of Link Belt Supply Co. in Minneapolis.

ALLEGHENY LUDLUM STEEL CORP. again has on its staff Paul E. Floyd, district manager in the Chicago branch office.

CARBIDE ALLOY CORP. has recently been purchased by ALLEGHENY LUDLUM CORP.

FARREL-BIRMINGHAM CO., INC. has announced that Fernely H. Banbury has, at his own request, retired from active management of the Banbury Mixer Dept. and will act in a consulting capacity.

CUTLER-HAMMER, INC. has made W. E. Addicks manager of the New York District Office, and C. V. Topliffe manager of the Boston District Office.

ST. REGIS PAPER CO. of New York has completed plans for the immediate erection of its eleventh multiwall paper bag manufacturing plant, in North Kansas City, Missouri, to meet the demand for heavy-duty multiwall paper bags. The plant will be in full operation early in 1944.

TUBE TURNS has closed its Los Angeles office and opened two new offices on the West Coast, one at 2611-12 Russ Bldg., San Francisco, with T. H. Pike, Jr., as district manager for the Pacific Coast area, and the other in the Smith Tower Bldg., Seattle 4, Washington, with John M. Hartley handling matters pertaining to Washington, Oregon, and British Columbia.

Standard Oil Advances

Elected a vice-president of the Standard Oil Co. (N. J.), J. B. Carringer, above, will continue as general manager of manufacturing operations. J. W. Connolly and Harry G. Burks, Jr., have been made company directors.

H. K. PORTER CO., INC. has named Victor P. Shaffer engineer in charge of design for the Process Division as well as director of development and research.

BLACKMER PUMP CO. has opened a new office in the Commercial Trust Bldg., 15th and Market Sts., Philadelphia, Pa.

BRIGGS CLARIFIER CO. has reorganized its sales force appointing Henry T. Moore general sales manager, E. K. Burgess and J. H. Nash, assistant sales managers, J. M. Willis, Ohio sales and engineering representative, and J. J. Stroud, engineering and sales representative for Kentucky. Walter J. Ewbank has been made the company's chief engineer.

WHEELCO INSTRUMENTS CO. has announced recent additions to its sales and service organization including the COCHRANE STEAM SPECIALTY CO. to serve in New England, together with George W. Hall, the present representative; C. L. Clark in charge of the Buffalo office; Charles D. Mount, sales and service representative for southern Ohio and northern Kentucky; H. E. Holling northwestern Illinois representative; and the LANG CO., Salt Lake City representative in Utah, Idaho, Wyoming, and Nevada.

"Salvage Manual for Industry"

First comprehensive practical manual on industrial salvage ever prepared has just been published by the Technical Service Section, Industrial Salvage Branch, Salvage Division, War Production Board, and is now being distributed to industry.

The well-illustrated volume may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., for fifty cents per copy.

Chemical Industry Shy of Manpower

Alarming manpower problems, which threaten to continue to the end of the war, confront the chemical industry whose production doubled since 1939 and is virtually 100% necessary to the war economy, Dr. J. W. Raynolds of Chemical Division of War Production Board, declared in a survey reported to the American Chemical Society. The labor program must be met, he asserted, to ensure that the production program can be maintained.

Migration of workers to more glamorous and better-paid industries, serious wage differentials, and lack of appreciation by civilians, governmental offices and the chemical industry itself of the basic importance of that industry in war combine to present a situation crying for solution, according to Dr. Raynolds. Citing examples, he pointed to a critical lag in production of plastics, a vitally needed catalyst for aviation gasoline, and materials for bomber brake fluid, rubber chemicals, an explosive, and atabrine.

Before the war, he said, the industry as a whole had a high annual "take-home" wage, but in many areas now this base pay is from 10 to 30 % below some of the other war industries.

As an example, he pointed out that the base rate in a certain plastics plant is 65 cents an hour for women, while unskilled women are paid 85 cents an hour to learn welding in a near-by shipyard, with a guarantee of 92 cents an hour after two weeks.

"Currently," he said, "this plastics plant is unable to get enough women, men or boys to operate above 40% capacity. As a result, a lend-lease plastic requirement is several months behind schedule. The local War Labor Board has turned down the company's appeal for relief.

Chemical Exposition

The Nineteenth Exposition of Chemical Industries will be held at Madison Square Garden, 49th Street and Eighth Avenue, New York City, Dec. 6-11. It opens Monday, Dec. 6 at 2 p. m. and thereafter the hours are 11 a.m. to 10 p. m. It will close on Saturday at 6 p. m. Advance information indicates that more than half of the displays will relate to machinery and manufacturing equipment, with technical equipment including research apparatus, instruments and controls, and processing materials following in order of precedence.

All visitors will be registered at the main gate on first arrival upon presentation of invitations or credentials showing professional or business connections entitling them to privileges of the floor. The general public will be excluded. There will be no charge for registration and no admission fee.

Chemical Industries will again have a booth exhibiting its "New Chemicals for Industry"—approximately four hundred new developments within the field during the past two years. Those interested in inspecting these new products are cordially invited to the booth.

U. S. Industry Increases Reserves 2,800%

Starting almost from scratch in 1939, American industry by the end of 1942 had increased its war and post-war reserves by more than 2,800%, it was disclosed in a survey made public by the Securities and Exchange Commission.

The study was based on the five largest companies, on the basis of 1939 net sales, in fifty basic industry groups, and showed that since the outbreak of the war in Europe, 146 of the 250 companies that were studied had set up 171 war or post-war reserves, amounting in the aggregate at the end of 1942 to $514,593,000, or 2.19% of the total assets of the 146 companies.

Although relatively few in number, the economic importance of the 250 corporations was evident, the SEC asserted, from the fact that their total assets aggregated $31,900,000,000 at the end of 1942, an increase of 26.8% over 1939,

INDUSTRIAL TRENDS

Steel: Steel production in the United States in October set a new high record of 7,786,359 net tons, despite an estimated drop of 40,000 tons owing to the fourth coal strike of the year late in the month. The new figure is an increase of 115,000 tons over the previous peak of 7,670,187 tons in March, according to the American Iron and Steel Institute.

Electric Power: Electric power production decreased the week ending November 6. when the seasonal trend was up and the adjusted index dipped to 153.6 from 154.5 in the previous week. The figure was 134.0 for the week ended Nov. 7, 1942.

War Outlay: War spending in October exceeded that in September by more than a million dollars a day, the Treasury's end-of-the-month statement disclosed recently.

Commodity Prices: Advancing prices for agricultural products, particularly fresh milk, onions, potatoes and apples, brought the Bureau of Labor Statistics' index of commodity prices in primary markets up 0.1 per cent during the first week of November.

Fortress Europe

(Continued from page 676)

cotton and of poorer quality. Not enough hides are produced to supply the great need for leather. In place of wool and leather only very poor "ersatz" materials are produced from cellulose and plastics.

The Reich is rich in bituminous coals and lignites. They supply power plants and industrial plants either directly or with byproducts produced from these raw materials. In order to produce aromatic compounds for explosives, such as toluene, phenol, diphenylamine, etc., and hydrocarbons for high octane gasoline, Germany has to crack or to convert catalytically large amounts of her synthetic fuel produced by the hydrogenation of carbon monoxide with the Fischer-Tropsch process and by the hydrogenation of coal with the Bergius I. G. process. The petroleum supplies coming from Germany, Austria and especially from Poland are dwindling. Rumania also does not produce enough petroleum for the hunger of the German war machine. The destruction of part of the oil refineries in Ploesti is partly responsible for the withdrawal of the German troops in Russia to shorter lines The main bottleneck for Fortress Europe remains the production of sufficient lubricating oil, especially that which retains its flow at low temperatures.

Statistical data on the production of liquid fuels in Fortress Europe vary. The most optimistic estimates, from the German standpoint, are that in 1943, 8,000,000 to 10,000,000 tons of liquid fuel will be produced, either from natural sources or synthetically in Germany, Austria and Czechoslovakia. One has to add to these figures about 4,000,000 tons of Rumanian oil. One arrives at a total production of 12,000,000 to 14,000,000 tons of liquid fuel. This compares with the present production of 225,000,000 tons in this country alone, to which the production of other countries on this continent and in Asia have to be added (Allies and Allied-controlled production 264,000,000 metric tons, South America 48,500,000 metric tons; Axis and Axis-controlled countries 24,000,000 metric tons in 1941).

The raw materials for the increased production of liquid fuels—branched aliphatic and aromatic hydrocarbons for super gasoline, any kind of liquid fuel for Diesel oil—come from natural and synthetic oils. Rubber-like materials are produced from oil, coal, acetylene, ethylene derivatives, alcohol (made in Germany mostly from potato starch and less from grain) and butylene diglycol. Fortress Europe is much less fortunate than the Allied nations which control about 93% of the world's oil production. Before the

(Turn to page 750)

Fortress Europe

(Continued from page 748)

Dutch East Indies were lost, only 4.5% of the world's oil production (natural and synthetic) was at the disposition of the Axis powers.

The Allied nations which occupy the outer lines have to use much more fuel for transportation than Germany which has the advantage of the inner line.[11]

By avoidance of waste and introduction of "ersatz" and "ersatz ersatz," Germany up to now has been able to maintain her war machine. But, as in the last war 25 years ago, this situation cannot be maintained forever. The superiority of the Allied nations over the Reich and Fortress Europe in man power and armament will become more and more accentuated in the future. The U.S.A. alone this year will produce more than 90,000,000 tons of steel which compares with 40,000,000 tons production capacity in Fortress Europe of which by the bombardment of the Ruhr and of French industrial centers and very soon of Austria and Czechoslovakia an important percentage has been and will be destroyed.

One may come, therefore, to the following conclusions. The final outcome of the war must be the victory of the Allied nations. They command a large part of the resources necessary for carrying out this war successfully. Their soldiers, fliers and sailors fight as free men. Democratic nations see in their fighting men the most valuable assets whose lives must be preserved by all means. Totalitarian leaders consider human lives as the cheapest war material which can be wasted without any consideration. Germany depends to a certain extent on mercenaries, the satellite troops which, as the last months have shown, are of doubtful value. Important factors, like courage, technical skill, equipment of the best quality, superiority of strategic plans, cannot be measured and cannot be represented by figures.

A pseudo equilibrium which existed before the war is now changed by a most violent reaction which will lead, we hope, to a true equilibrium. The main question is how long this violent reaction must last before victory is won. Careful preparation for the present war by Germany since the 1918 armistice, storage of strategic materials before and after Hitler came into power, use of elements of surprise in the first eighteen months of the war, the rich loot won by the diplomatic and military successes in 1938-40 and many other factors were in favor of prolonging the war. Now these "negative catalysts" are used up or have been fundamentally changed. On the other hand, the American and British technical skill used in the conversion of raw materials into final products, the production of an overwhelming amount of the best and most modern weapons, the excellent leadership, the best training and the fine fighting power of the Allied armed forces, the change from a defensive to an offensive war, the destruction of many important production centers in Germany, France and Italy by air attack and, last but not least, the spirit of free men, act as powerful promoters.

The horoscope of coming events is rather bright. The Allies' power mounts and that of the Axis declines. But it would be a disastrous mistake to grow weak in the efforts to end the war as quickly as possible and with the minimum of sacrifice in lives. The United Nations must remain united in the future so that the war and the peace will be won. Until the war is won and a lasting peace is guaranteed, every progress in science and technology must be put into action at once. Research and the quick application of its results are among the most important factors which lead to final success.

[11] "One day of an all out offensive consumes 42,000 tons of petrol, an air offensive on the European front on one active day requires 2,750,000 gallons of high test aviation gasoline. To these figures must be added the fuel consumed by supply trucks, repair trucks, jeeps, tanks, other fuel-consuming vehicles and the fuel needed by the navy in combat and convoy transportation."

Between the Lines

(*Continued from page 732*)

Action in curtailing work on the Northwest plant was based on the manpower situation in that area. More recently, WPB has adopted a similar position as to completion of the other two plants, on the ground that development of alumina from clay is not necessary.

The latter view is now confirmed by formal WPB action which has restricted all marginal mineral production. This reversal is based on changed factors in the mineral production program, but more so on changed manpower requirements. The position is that revised military requirements have resulted in a greater need for marginal manpower than for marginal minerals.

In line with this position, it has now been ordered that after stockpiles of steel alloying elements—vanadium, tungsten, molybdenum, cobalt, etc.—reach certain levels, domestic production as well as imports will be geared to current consumption. Government purchases of certain ferro-alloy minerals have been, or shortly will be reduced. Premium prices no longer are being paid for lead and zinc.

Bauxite mining operations in Arkansas have been reduced since October 1 by about 65 per cent, production there having been increased from about 100,000 tons per year to a high of about 700,000 tons during the peak of aluminum production. One aspect of this step is generally overlooked in the discussions that have ensued. It may be said to parallel on a minor scale the recent question of whether it is better for this country to continue draining its oil resources for the rest of the world, or to begin to invite other oil-possessing associated nations to contribute from their reserves. In short, if the domestic bauxite supply is as low as some have claimed, is it desirable to continue to use up these remaining reserves, or to draw on foreign ore more heavily?

This introduced another question: assuming the industry reverts to more normal operations after the war, and that figures reported for the domestic ore supply are in line, would not the Arkansas and other domestic ore deposits prove adequate for a good many years of conservative use, if not used up by abnormal demands now? At an output of 100,000 or even several times that number of tons, the remaining high grade ores in the state should be sufficient for many years ordinary operations on this basis.

A number of issues are fairly obvious as a result of the current situation and its handling. There is a conflict between domestic and foreign labor interests, with those at home raising the question of competition with low-paid tropical workers and resenting their being laid off or forced into other work. The charge has been leveled that such foreign supplies are under necessity of heavy protection by an occupying American military force, in addition to the haulage and other problems.

As might be expected also, the old cry of monopoly has been raised in Congress, aimed primarily at major private producers. Here it is pertinent to recall the size of the Federal financial stake in present aluminum producing capacity, and to recall the present trend to greater Federal utilization of war-born resources of all kinds.

In this connection the huge government power program should be kept in mind. The most aggressively-pushed projects are at present in the Northwest where public power is an acute issue. The relationship between cheap power and aluminum is apparent, of course. The present cost and necessity of shipping regular bauxite ore to these remote plants, which in war operation have been using 600,000 tons of alumina annually, gives the substitute mineral proponents a further argument, coupled with the original one that these states possess abundant clays that will serve the purpose. It is something to watch.

CHEMICAL SPECIALTIES NEWS

Adjust Soap Formulas

Adjusted soap formulas prescribed recently by the War Food Administration are designed to effect an increase in the nation's soap supply of approximately 9% without using additional fats and oils. At the same time, the Office of Price Administration amended its price controls over soaps so that manufacturers may comply with the program without changing prices as long as the serviceability of the soap products is not reduced.

The adjusted formulas call for a larger use of domestic non-fat materials, principally rosin, as substitutes for fats. The percentage of substitution will be from 2 to 15%, depending on the type of soap, as follows:

Type	*Rosin*	*Rosin or Builders*
Toilet Bars	2%	(none)
Fine Fabrics	5%	(none)
Floating Soap	2%	(none)
White Laundry	4%	(none)
Chips and Granules (62%)	5%	5%
Chips and Granules (82%)	5%	10%

No change is required for washing powder, hand paste, liquid soap or yellow laundry soap. The latter is standardized at 58% total anhydrous soap, of which 62.5% is maximum fat content; balance, rosin.

To effect the increase in soap supply, WFA has issued Food Distribution Order No. 86, requiring manufacturers to use rosin in prescribed percentages for most soaps, and water softening builders—trisodium phosphate, sal soda and modified soda—for laundry soaps and flakes. The order was effective November 1, 1943.

New General Mills Division

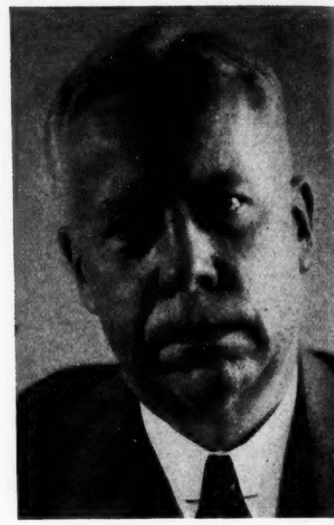
General Mills, Inc., has announced at Minneapolis the establishment of a new vegetable oil processing division that will engage in oil milling and in the preparation of vegetable protein concentrates. It is headed by Whitney H. Eastman, who became research executive of General Mills a few weeks ago.

Vegetable protein concentrates are used primarily for animal feeds and fertilizer, but also provide a wide range of industrial products, including plywood glue, adhesives, paper coatings and sizings, cold-water paints, plastics and fiber, said company officials. The new division is expected to investigate the possibilities of such commercial oil-bearing products as the peanut, cottonseed, castor bean, soy bean and flaxseed.

Woodbury Joins Hercules

Holder of the National Ass'n of Insecticide and Disinfectant Manufacturers' fellowship for two years, Dr. E. N. Woodbury has been appointed to the Insecticide Division of Hercules Powder Co.

Slocum Heads OPA Unit



Clarence W. Slocum, president of Beckwith-Chandler Co., producer of paints and varnishes, has been appointed to direct the industrial manufacturing price division of OPA.

Opens Research Lab

Turco Products, Inc. has organized an organic research laboratory to study new problems in the metal industries. Heading the new department will be Dr. Nathaniel Baum, consulting chemist in organic synthesis and resins.

Flavor Ass'n. Convenes

Thirty-eighth annual convention of the National Manufacturers of Soda Water Flavors was held November 17 at St. Louis, Mo. Featured at the meeting was a round table discussion for the formulation of policies on problems affecting the flavoring products industry.

WAR REGULATIONS SUMMARY

Borax and Boric Acid—These products removed from Schedule A of Order M-161 which governs exceptions from inventory restriction. Purpose is to subject these chemicals to the minimum practicable inventory restrictions of Priorities Regulation 1 and thus make them more available for consumption. November 1.

Calcium Carbide—Ceiling prices for Defense Supplies Corporation sales of generator and mixed grades reduced to levels approximating prices charged by commercial sellers. Specific ceilings are provided for industrial consumers, shipyards, acetylene plants and chemical plants. Sup. Reg. 14, Amendment 49, effective November 1.

Castor Oil—Restrictions lifted on delivery and use for non-essential civilian products during October, November and December 1943. F.D.O.-32 amended, effective October 1.

Dibutyl Sebacate—Sliding scale of prices established by OPA, based on weighted average costs of butyl alcohol. M.P.R. 37, Amendment 10, effective November 10.

Dyes and Organic Pigments—WPB has increased by one-sixth the amount of these products permitted to be used for civilian purposes. Carryover of undelivered portions of export quotas is allowed only if these are used in the following quarter. Order M-103 amended October 23.

Ethyl Alcohol—Current costs instead of costs for the preceding quarter may now be used as the basis for computing maximum prices of industrial ethyl alcohol produced by West Coast converted distilleries and sold to the government. MPR 295 Amendment 4, effective November 15.

Fats and Oils—Allowance of fats and oils for manufacture of household soaps increased from 80 to 90% of the 1940-41 base use; for industrial soaps 80 to 110%; and for abrasive mechanics soap 80 to 150%. Percentage allowed for paints, varnishes, lacquers, linoleums, oilcloth and similar products increased from 50 to 60% of the base period use.

Fatty Acids—Inventories (excluding production by user) limited to a 60-day supply in order to provide better distribution of available supplies. F.D.O.-87, effective November 1.

Glycerine—Consumers receiving glycerine by tankcar are permitted to accept up to 5% in excess of the quantity allocated, if necessary to complete a practical shipping unit. Original order restricted this excess quantity to 550 pounds. F.D.O.-34 amended, effective October 20.

Glycerine—Use or delivery prohibited without specific authorization by War Food Administration, with certain specified exceptions. F.D.O.-34 Amendment 1, effective October 20.

Glycol Ethers—Monomethyl ether of ethylene glycol and monoethyl ether of ethylene glycol have been added to the glycol ethers under allocation. Order M-366 amended, effective November 1.

Gum Inhibitors—Du Pont No. 5, Du Pont No. 6, U.O.P. 4 and U.O.P. 5 placed under allocation effective November 1. Amounts of less than 10 pounds per month of any one type of inhibitor may be accepted by any one customer without WPB order. Allocation Order M-354, effective November 1.

Heat Exchangers—Scheduling provisions formerly imposed by the Heat Exchanger Order no longer apply. Scheduling is now being handled under M-293. Order L-172 amended October 27.

Laboratory Equipment—Authorization no longer required for purchase of items not on List A of Limitation Order 144. Several items removed from List A. Order L-144 amended.

Linseed Oil—Every crusher required to set aside for government purchase 25% of all raw linseed oil produced by him in every month beginning April 1944. F.D.O.-56 Amendment 1, effective October 26.

Lubricating Greases—Fats and fatty oils again may be used in the manufacture of certain lubricating greases without regard to the proportion of fatty acids used in the manufacture of those oil products. Petroleum Administrative Order 10 revoked.

Methyl Abietate—Methyl abietate and hydrogenated methyl abietate placed under allocation November 1. Miscellaneous Chemicals Order M-340.

Nickel Chemicals—Consumers of nickel chemicals and catalysts are no longer required to file Form WPB-287 to obtain supplies. M-6-a Direction 1. November 1.

Oleum—Exemption from price control extended indefinitely for sales of 40% oleum (109% sulfuric acid) to ordnance plants operated for or by the government. G.M.P.R. Rev. Sup. Reg. 1 Amendment 36. Effective as of July 3, 1943.

Operating Supplies—WPB has announced several amendments to Order P-89 for the purpose of simplifying procedure under this order governing distribution of maintenance repair and operating supplies in the chemical industry. One amendment establishes a method for obtaining specific MRO ratings under P-89, which can be used to obtain materials on the B list of Priorities Regulation No. 3. For ratings specifically assigned under Paragraph (e) or (f) of the Order for specific kinds and quantities of the items, applications should be made directly to the P-89 Unit of the Chemicals Division. Another amendment brings about conformity with Order L-197 which requires filing applications for steel drums with the Containers Division.

Oxidized Petrolatum—Placed under allocation November 1. Miscellaneous Chemicals Order M-340 amended.

Phosphorus—Producers for the Chemical Warfare Service may increase ceilings during current quarter to cover higher production costs. Buyer and seller permitted to make provisional monthly settlement at prices higher than G.M.P.R. levels. G.M.P.R. Rev. Sup. Reg. 14, Amendment 38, effective October 1.

Soap—Soap formulas have been adjusted by the War Food Administration to include from 2% to 15% of domestic non-fat materials, principally rosin, as a substitute for fats. F.D.O.-86 amended.

Vinsol Resins—Placed under allocation November 1. Miscellaneous Chemicals Order M-340 amended.

Supply Woes Shift to Lumber and Rubber

Lumber and rubber emerged as the most critical supply problems of the approaching year as the War Production Board's requirements committee began consideration of the requests filed for the first quarter of 1944 by war and civilian agencies of the Government.

Carbon steel, copper, aluminum and non-ferrous metals, which have been the "problem children" of the war requirements committee since Pearl Harbor, are being whipped into line through stringent curtailment of their uses and through expansion of production. Carbon steel will come within 10% of meeting all requirements in the first quarter of 1944 (in the previous quarter it was 20 to 25% behind), while copper needs for essential war requirements will probably be met within less than 10% of the essential needs. In so far as aluminum and nonferrous metals are concerned, the problem has eased materially.

Production of synthetic rubber has met all expectations, WPB officials said, but the problem here is in making the synthetic product match the efficiency of natural rubber. Executives forecast months of experimentation before the synthetic material can be processed at the same rate as crude rubber.

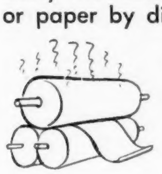
Technical-ities

By Ed. Rosendahl

Diglycol Stearate S is non-hygroscopic in character and is recommended as a plasticizer for paper. When mixed into the stock in the form of a water dispersion, the paper does not change with varying degrees of humidity, and the opacity of the stock is increased.

"Koroseal" can be made more acid-resistant by the incorporation of ACRAWAX C.

For waterproof textiles and paper that will withstand washing in boiling water, ACRAWAX C POWDER is suggested. This powdered wax has a melting point of 275°F. and is generally used by making a slurry with hot water which is applied to the cloth or paper by dipping or coating. After the water is evaporated, the material that is being waterproofed is passed between hot rollers which causes the wax to thoroughly impregnate the cloth or paper.



It is often necessary to increase the flow point of asphalt melts without raising the brittling point. By adding 10% ACRAWAX C to these melts, it will increase the flow point of 160°F. softening asphalt to 260°F. without raising the brittling point.

Blends of STROBA WAX and paraffin wax are highly recommended for increasing the luster and melting point of paraffined paper, and are easily applied by the roller-coating method.

Each Month these and many other uses of our products will be mentioned here. However, you should have a copy of our catalogue, "Chemicals by Glyco," which covers a wide range of product uses. Just send to Glyco Products Company, Inc., 26 Court Street, Brooklyn 2, New York.

MARKETS IN REVIEW

CHEMICAL and general industrial production index figures were drastically revised by the Federal Reserve Board during September to better reflect wartime activity. The September production figure as a result is 243 per cent of the 1935-1939 level, compared with the previous computation of 207.

The new index also gives more emphasis to "man-hours of work," in a number of instances instead of unit of production. The man-hours compilation is used, for example, in determining activity in the rubber industry where plants are engaged in work not requiring rubber. New series have been added to more adequately represent such industries as aluminum, magnesium, industrial chemicals, military explosives and ammunition. The revised index reflects man-hours to the extent of 58 per cent compared with 32 per cent for this series in the 1935-1939 base period.

The criticism is made that the new Federal Reserve Index has been inflated by war production data to such an extent that it may no longer serve in making comparisons with normal peace-time industry. The Board, however, rightfully has accorded recognition to new industries and new products in this war which were not adequately represented in the former index.

Further, the new index covering chemical production should prove more informative even though its weight in the general index is unchanged at 6.7 per cent. Synthetic rubber production is a new chemical activity included in this group; so is the enormously expanded production of alcohol. Confidential data on explosives and munitions are obtained from the War Production Board. Man-hours data from the Department of Labor, adjusted with production figures obtained from the Tariff Commission, Bureau of the Census, WPB and other agencies, and broadened through the inclusion of a weightier list of industrial chemicals, make up the formula for determining the new chemical production index.

October brought some relaxation in the tense supply picture, also a peace sentiment in the security and commodity markets and price declines. Although termination of hostilities is still some way off in the view of military authorities, war contractors now are giving some attention to reduction in inventories instead of further accumulation. Factors in this new policy were said to be a marked improvement in materials distribution technique, the absence of inventory protection provisions in contract termination procedures.

Plastics materials, the acetates especially, gave indications of an improved supply-demand situation last month. The WPB also modified, for the first time, the severe restrictions upon the civilian uses of organic dyestuffs and organic pigments, raised permitted exports of dyes to 17 per cent from the former 15 per cent allotment. The quantity of dyes and pigments allowed for civilian use was increased by one-sixth.

Allocation requests for acetate plastics showed a sharp trend reversal in October and November, the result of limitation of orders to the amount that can be processed in a 30-day period. In September the demand for cellulose acetate and cellulose acetate butyrate ran four times ahead of capacity.

It may be too early to look for an easing of restrictions in resins and plastics in view of their widespread war applications, but the supply situation has improved; in acrylics, vinyls, polystyrene as well as in cellulose acetates. Toward the end of October it was learned that the WPB was granting full allocations of urea-formaldehyde for use in adhesives for war materials and for furniture. Productive capacity has been increased for both urea and melamine resins as it has in other resin types. Further expansion in phenol-formaldehyde resins, however, will probably be checked by growing needs for benzol for other top-list war purposes. The WPB Chemicals Division looks for improvement early in 1944 in the supplies of vinyl resins, Saran, off-grade vinyl chloride scrap, polyvinyl butyral, polyvinyl acetate, polyvinyl alcohol and polyvinyl formal.

The container industry; paper, fiber, glass, cellulose and resin materials entering such products, is making considerable volume of chemicals. Authorities in the industry place the dollar volume of the packaging industry for 1943 at $3,440,000,000, compared with $2,678,000,000 in 1942. Fiber drums show a remarkable percentage increase with production of this new-type container alone this year amounting to 25,000,000, a five-fold increase over 1941.

During 1941 the glass industry turned out some 71,000,000 gross containers of this material. During the current year production is expected to reach between 92,000,000 and 95,000,000 gross. Fiber, glass and resins were pressed into service when metals no longer became available for containers. The chemical industry promises to benefit from postwar extension in the use of the newer packaging materials, and find a partial outlet for its war-expanded capacity in resins, cellulose, soda ash, chlorine, etc.

The pulp situation unfortunately deals a blow to the container manufacturers as it does at this time to the paper and synthetic fabric industries. The lack of pulp has forced a number of paper mills to shut down, and the paralysis may spread. The entire allocations system for wood pulp may require drastic overhauling, and control over end use is possible to assure supplies to mills working on essential business. The principles of the Controlled Materials Plan, now operative in metals, have been suggested for pulp, in which case the "claimant agencies" would be chemicals, Lend-Lease, the armed forces and rayon.

Cotton textile spokesmen are more than ordinarily concerned over the restrictions which have been imposed upon this industry, normally a leading dye and chemical-consuming field. The production of cotton goods has fallen to a level 15 per cent under the maximum recorded in 1942. Labor, price controls and an unsatisfactory contract renegotiation system are blamed. Weekly consumption in this country rose to an average of 219,900 bales in 1942, the peak occurring in the spring at 230,000 bales. By July of this year the weekly rate had been pushed down to 190,800 bales, from which level only mild recoveries have taken place.

Chemical fertilizer supplies for 1943-1944 will prove ample if present plans of the War Production Board carry through. For meeting critical agricultural nitrogen needs, the program will lean heavily on ammonium nitrate produced by the TVA here and by Canadian plants. This will mean limiting Chilean nitrate imports to 500,000 tons (bulk), although the War Food Administration is reported as favoring the importation of 1,000,000 tons, the same as last year.

The supply of inorganic nitrogen for farm use is expected to reach 605,000 tons (in terms of N), conditioned on the continued use of ammonium nitrate and nitrogen solutions, plus the 500,000-ton import from Chile which would equal 80,000 tons actual nitrogen. More than 800,000 tons of sulfate of ammonia (bulk) also may come from coke ovens. Fertilizer trade authorities are not certain that farmers can be induced to use ammonium nitrate, condition of which has been improved. In the past the product caked easily in

storage due to its hygroscopic characteristics.

The WPB Chemicals Division has agreed to bring superphosphate production up to the record figure of 7,000,000 tons during 1943-1944, or 20 per cent more than 1942-1943. The production of 700,000 tons of primary potash (K^2O) is anticipated. Not mentioned in this program are the government's intentions with regard to Russian potash. Trade reports, not officially confirmed, are that several shipments of Russian salts arrived recently on the West Coast.

Heavy Chemicals. The position of alkalies remained exceedingly tight throughout October, and the efforts of manufacturers to choke off even the small movement to the resale market evidently were successful. Solid caustic soda was quoted as high as $2.90 per 100 pounds at the Gulf, and quantities of both caustic and soda ash were difficult to locate for export shipment. Later, uncertainty was created in a number of heavy chemicals on reports of lessened Lend-Lease demands, more cautious domestic buying. Chlorates and phosphorous compounds are said to be moving out to consuming plants as fast as they are produced, with the entire production in both cases under allocation. The final quarter usually finds phosphorous manufacturers taking advantage of high electric power rates by curtailing production and making repairs. This year phosphorous outputs have been continued, and the OPA authorized advances in ceiling prices for these compounds to meet the added power costs.

Fine Chemicals. Trade reports are to the effect that not more than 50,000 lbs. of menthol are available for the manufacture of needed drugs and pharmaceuticals, against normal requirements of over 350,000 lbs. The freezing of peppermint oil stocks meanwhile prevents their use in synthetic manufacture to make up part of the menthol formerly imported from the Far East. As a result a number of mentholated products are being dropped by cosmetic and drug makers. Lanoline, wool grease product, is being practically all taken for military use, leaving other consumers without supplies in the months ahead. Two leading B Complex vitamins were slashed further in price as manufacturers were able to lower costs through large production. Thiamin hydrochloride (B-1) was cut $25 to a kilo quotation of $265 while Riboflavin (B-2) came down $60 per kilo to $430, new low prices for both products. Higher prices on the other hand were effected at the start of November for synthetic camphor, which action was preceded by active consumer buying. The alcohol outlook was further clouded by a breakdown in negotiations between Washington and Cuban and Puerto Rican sugar producers for 1944 molasses supplies. Rising synthetic rubber production meanwhile is beginning to cut into the WPB alcohol stockpile.

Coal Tar Products. The new toluol-xylol blend experienced a lively industrial demand despite the fact that its cost, 31c gal., is 4c over the price paid for straight xylol. A manufacturer reduced prices on the hydrogenated solvent cyclohexane to 9.5c lb., and on cyclohexanone to 29c lb., tank cars. The benzol-phenol situation underwent little if any change and both continued to move into war production of rubber, plastics and aviation fuel in heavy volume.

Paint Materials. Shellac supplies have been increased materially through larger importations, but very little is being released to industry by the Defense Supplies Corp., which is said to be building a stockpile of 25,000,000 lbs. Huge stocks of casein also are reported on hand, and a new producing season has started in Argentina. The easing of some oils for the paint manufacturing industry may find reflection in broadened sales activity later, provided packaging materials are made available. Carbon black demand turned more active during the month but most of this came from the rubber manufacturers employing the furnace types.

Government stockpiles of gum rosin are being depleted by soap and paper requirements.

CURRENT PRICES

Chemical prices quoted are of American manufacturers for spot New York, immediate shipment, unless otherwise specified. Products sold f.o.b. works are specified as such. Import chemicals are so designated.

Oils are quoted spot New York, ex-dock. Quotations f.o.b. mills, or for spot goods at the Pacific Coast are so designated.

Raw materials are quoted New York, f.o.b., or ex-dock. Materials sold f.o.b. works or delivered are so designated.

The current range is not "bid and asked," but are prices from different sellers, based on varying grades or quantities or both.

Purchasing Power of the Dollar: 1926 Average—$1.00
Oct. 1941 $1.017   Oct. 1942 $0.924   Oct. 1943 $0.900

	Current Market		1943 Low	1943 High	1942 Low	1942 High
Acetaldehyde, 99%, drs. wks. lb.	.11	.14	.11	.14	.11	.14
Acetic Anhydride, drs, ...lb.	.11½	.13	.11½	.13	.11½	.13
Acetone, tks, delv (*PC*) ..lb.	...	.07	...	.07	.07	.158
ACIDS						
Acetic, 28%, bbls (*PC*) 100 lbs.	**3.38**	**3.63**	**3.38**	**3.63**	**3.38**	**3.63**
glacial, bbls. ....100 lbs.	9.15	9.40	9.15	9.40	9.15	9.40
tks, wks ..... 100 lbs	...	6.93	...	6.93	6.25	6.93
Acetylsalicylic, Standard USP ....lb.	.40	.54	.40	.54	.40	.40
Benzoic, tech, bbls ......lb.	.39	.43	.39	.43	.43	.47
USP, bbls ....lb.	.54	.59	.54	.59	.54	.59
Boric, tech, bbls, c-l, ..ton a	...	109.00	...	109.00	108.00	109.00
Chlorosulfonic, drs, wks ..lb.	.03	.04½	.03	.04½	.03	.04½
Citric, crys, gran, bbls, c-l lb. *b*	.20	.24	.20	.24	.20	.21
Cresylic 50%, 210-215° HB, drs, wks, frt equal (A) gal.	.81	.83	.81	.83	.81	.86
Formic, Dom. cbys ......lb.	.10½	.11½	.10½	.11½	.10½	.11½
Hydrofluoric, 30% rubber, dms. ....lb.	.08	.09	.08	.09	.06	.06½
Lactic, 22%, lgt, bbls wks lb.	.039	.0415	.039	.0415	.039	.0415
44%, light, bbls wks lb	.073	.0755	.073	.0755	.073	.0755
Maleic, Anhydride, drs lb	.25	.26	.25	.26	.25	.26
Muriatic, 18° cbys ...100 lb.	1.50	2.45	1.50	2.45	...	...
20° cbys, c-l, wks ..100 lb.	...	1.75	...	1.75	1.75	1.75
22° cbys, c-l, wks ..100 lb.	...	2.25	...	2.25	2.25	2.25
Nitric, 36°, cbys, wks 100 lbs. *c*	5.00	5.95	5.00	5.95	5.00	5.00
38°, c-l, cbys, wks 100 lbs. *c*	...	5.50	...	5.50	5.50	5.50
40°, c-l, cbys, wks 100 lbs. *c*	...	6.00	...	6.00	6.00	6.00
42°, c-l, cbys, wks 100 lbs. *c*	...	6.50	...	6.50	6.50	6.50
Oxalic, bbls, wks (*PC*) ..lb.	.11¼	.12½	.11¼	.12½	.11¼	.14½
Phosphoric, 75% USP, ..lb.	.10½	.13	...	.12	.12	.12
Salicylic, tech, wks (*PC*)..lb.	.26	.44	.26	.44	...	.33
Sulfuric, 60°, tks, wks ..ton	...	13.00	...	13.00	...	13.00
66°, tks, wks ....ton	...	16.50	...	16.50	...	16.50
Fuming (Oleum) 20% tks. wks ....ton	...	19.50	...	19.50	...	19.50
Tartaric, USP, bbls ......lb.	...	.70½	...	.70½	...	.70½
Alcohol, Amyl (from Pentane) tks, delv ....lb.	...	.131	...	.131	...	...
Butyl, normal, syn, tks (PC) ....lb.	...	.10¾	...	.10¾	.10¾	.168
Denatured, CD, 14, c-l drs, (*PC, FP*) ....gal. *d*	...	.54½	...	.54½	...	.65
Denatured, SD, No. 1, tks. *d*	...	.50	...	.50	...	.53
Ethyl, 190 proof tks....gal	...	11.90	...	11.90	8.12	11.92
Isobutyl, ref'd, drs .....lb.	...	.086	...	.086	...	.086
Isopropyl, ref'd, 91% gal.	.39	.66½	.39	.66½	.40½	.43½
Propyl, nor, drs, wks gal.	.67	.70	.67	.70	.69	.75
Alum, ammonia, lump, bbls, wks ....100 lb.	...	4.25	...	4.25	...	4.25
Aluminum metal, (*FP*) 100 lb.	15.00	16.00	15.00	16.00	15.00	16.00
Chloride anhyd 99% wks lb.	.08	.12	.08	.12	.08	.12
Hydrate, light, (A) ....lb.	.14½	.15	.14½	.15	...	.14½
Sulfate, com, bgs, wks 100 lb.	1.15	1.25	1.15	1.25	1.15	1.25
Sulfate, iron-free, bgs, wks ....100 lb.	2.35	2.50	2.35	2.50	1.75	1.85
Ammonia anhyd, 100 lb cyl lb.	...	.16	...	.16	...	.16
Ammonium Carbonate, lumps, dms ....lb.	.08½	.09¼	.08¼	.09¼	.08¼	.09¼
Chloride, whi, bbls, wks, 100 lb.	4.45	5.15	4.45	5.15	4.45	...
Nitrate, tech. bags. wks. lb.	.0435	.0850	.0435	.0850	.0435	.0455
Oxalate pure, grn, bbls..lb.	.27	.33	.27	.33	.27	.33
Perchlorate, kgs (A) ...lb.	.55	.65	.55	.65	.55	.65
Phosphate, dibasic tech, bbls ....lb.	.07¼	.08½	.07¼	.08½	.09¼	.09¼
Stearate, anhyd, dms ...lb.	...	.34	...	.34	...	.24½
Sulfate, f.o.b., bulk (A) ton	28.20	29.20	29.00	30.00	29.00	30.00
Amyl Acetate (from pentane) c-l, drs, delv ....lb.	...	.18½	...	.18½	...	...
Aniline Oil, drs ....lb.	.11½	.12½	.11½	.12½	.12½	.16
Anthraquinone, sub, bbls..lb.	...	.70	...	.70	...	.70
Antimony Oxide, 500 lb. bbls (A) ....lb.	.15	.15½	.15	.15½	.15	.16½
Arsenic, whi, kgs (A) ... lb	.04	.04¼	.04	.04¼	.04	.04¼
Barium Carbonate precip, 200 lb bgs, wks ....ton	55.00	60.00	55.00	60.00	55.00	65.00
Chloride, delv, zone 1..ton	77.00	90.00	77.00	90.00	77.00	92.00

USP $25 higher; Prices are f.o.b. N. Y., Chicago, St. Louis, deliveries ½c higher than NYC prices; *y* Price given is per gal; *c* Yellow grades 25c per 100 lbs. less in each case; *d* Prices given are Eastern schedule. *a* Powdered boric acid $5 a ton higher; *b* Powdered citric is ½c higher;

Current Prices

	Current Market		1943 Low	1943 High	1942 Low	1942 High
Barytes, floated, bbls. ....ton	...	36.00	...	36.00	...	...
Bauxite, bulk mines (A) ton	7.00	10.00	7.00	10.00	7.00	10.00
Benzaldehyde, tech, cbys, dms lb.	.45	.55	.45	.55	.45	.55
Benzene (Benzol), 90%, Ind. 8000 gal tks, ft all'd gal	(A)	.15	(A)	.15	...	.15
Benzyl Chloride, cbys ....lb.	.22	.24	.22	.24	.22	.24
Beta-Naphthol, tech, bbls, wks ....lb.	.23	.24	.23	.24	.23	.24
Bismuth metal, ton lots...lb.	...	1.25	...	1.25		1.25
BlancFixe, Pulp, bbls, wks ton *h*	40.00	46.50	40.00	46.50	40.00	46.50
Bleaching Powder, wks, 100 lb.	2.50	3.60	2.50	3.60	2.25	3.10
Borax, tech, c-l, bgs ....ton *i*	..	45.00	..	45.00	45.00	46.00
Bordeaux Mixture, drs ..lb.	.11	.11½	.11	.11½	.11	.11½
Bromine, cases ....lb.	.25	.30	.25	.30	.25	.30
Butyl, acetate, norm drs, lb.	...	.1755	...	.1755	.124	.168
Cadmium Metal (*PC*) lb.	.90	.95	.90	.95	.90	.95
Calcium, Acetate, bgs. 100 lb.	3.00	4.00	3.00	4.00	3.00	4.00
Carbide, drs ....ton	50.00	95.00	50.00	95.00	...	...
Carbonate, tech, c-l bgs, ton	18.00	22.00	18.00	22.00	16.00	20.00
Chloride, flake, bgs c-l ton	18.50	35.00	18.50	35.00		21.00
Solid, 73-75% drs, c-l, ton	18.00	31.50	18.00	31.50	18.00	34.50
Gluconate, U.S.P., drs. lb.	.57	.58	.57	.58	.52	.59
Phosphate, tri, bbls, cl lb.	...	.0635	...	.0635	.0635	.0705
Camphor, U.S.P., gran, powd, bbls ....lb.	.68½	.70½	.68½	.70½	...	...
Carbon Bisulfide, 55-gal drs lb.	.05	.05¼	.05	.05¼	.05	.05¼
cyl ....lb.	.06	.08	.06	.08	.06	.08
Tetrachloride, (*FP*) (*PC*) cl, Zone 1, 52½ gal drms ....lb.	.73	.80	.73	.80	.73	.83
Casein, Acid Precip, bgs, 100 or more ....lb.	...	.24	...	.24	.15	.30½
Chlorine, cyls, lcl, wks, contract (*FP*) (A) .....lb.	...	.07¼	...	.07¼	...	.07¼
cyls, c-l, contract ..lb. *j*	...	.05¼	...	.05¼	...	.05¼
Liq, tk, wks, contract 100 llb.	...	1.75	...	1.75	...	1.75
Chloroform, tech, drs ....lb.	.20	.23	.20	.23	.20	.23
Coal tar, bbls, crude ....bbl.	8.25	8.75	8.25	8.75	7.50	9.25
Cobalt Acetate, bbls (A) lb.	...	.83¼	...	.83¼	...	.83¼
Oxide, black kgs (A) ..lb.	...	1.84	...	1.84	...	1.84
Copper, metal *FP*, *PC* 100 lb.	12.00	12.50	12.00	12.50	12.00	12.50
Carbonate, 52-54%, bbls lb.	.19½	.20	.19½	.20½	.18	.20½
Sulfate, bbls, wks (A) 100 lb.	5.00	5.50	5.00	5.50	5.15	5.50
Copperas, bulk, c-l, wks ..ton	...	14.00	..	14.00	...	17.00
Cresol, USP, drs, (A) ... lb.	.10¾	.11¼	.10¾	.11¼	.10¾	.11½
Cyanamid, bgs ....ton	1.52½	1.62½	1.52½	1.62½	no prices	
Dibutylamine, c-l, drs. wks lb.	...	.61	...	.61	.50	.61
Dibutylphthalate, drs .....lb.	.2180	.2230	.2180	.2230	.21	.23½
Diethylaniline, lb drs ..lb.	...	.40	...	.40	...	.40
Diethyleneglycol, drs lcl. wks. lb.	.14	.15½	.14	.15½	.14	.15½
Dimethylaniline, dms., cl., lcl. lb.	.23	.24	.23	.24	.23	.24
Dimethyl phthalate, drs ..lb.	.1970	.2050	.1970	.2050	...	.20
Dinitrobenzene, bbls ......lb.	...	.18	...	.18	...	.18
Dinitrochlorobenzene, dms lb.	...	.14	...	.14	...	.14
Dinitrophenol, bbls ......lb.	...	.22	...	.22	...	.22
Dinitrotoluene, dms ......lb.	...	.18	...	.18	...	.18
Diphenyl, bbls lcl. wks ....lb.	.16	.20	.16	.20	.15	.16
Diphenylamine bbls ....lb.	...	.25	...	.25	...	.25
Diphenylguanidine, drs ...lb.	.35	.37	.35	.37	.35	.37
Ethyl Acetate, 85% Ester tks, frt all'd ....lb.	.107	.110	.107	.110	.11	.12
Chloride, drs ....lb.	.18	.20	.18	.20	.18	.20
Ethylene Anhydrous frt all'd ....lb.	...	.75	...	.75	...	.75
Dichloride, cl wks ....drs, E. Rockies dms, cl. ..lb.	...	.0842	...	.0842	...	.0742
Glycol, dms, cl. .... lb.	...	.10	...	.10	.14½	.18½
Fluorspar, No. 1, grd. 95-98% bulk, cl-mines ....ton	...	37.00	...	37.00	...	...
Formaldehyde, c-l, bbls, wks (*FP*, *PC*) ......lb.	.055	.0575	.055	.0575	.055	.0575
Furfural tech, drs, c-l, wks lb.	..	.12½	..	.12½	..	.12½
Fusel Oil, refd, dms, dlvd lb.	.18½	.19½	.18½	.19½	.18	.19½
Glauber's Salt, bgs, wks 100 lb.	1.05	1.25	1.05	1.25	1.05	1.28
Glycerin (*PC*) CP, drs, c-l, lb.	...	.18¾	...	.18¾	...	.18¾
Saponification, drs, c-l, lcl or tks ....lb.	...	.12¾	...	.12¾	...	.12¾

GUMS

	Current Market		1943 Low	1943 High	1942 Low	1942 High
Gum Arabic, amber sorts bgs ....lb.	.14½	.15	.14½	.15	.14½	.24
Benzoin Sumatra, CS ....lb.	.60	.65	.60	.65	.45	.55
Copal, Congo, ...lb.	...	.55¾	...	.55¾	...	...
Copal, East India, chips ..lb.	...	.12	...	.12	...	...
Macassar dust ....lb.	.07⅜	.11¾	.07⅜	.11¾	...	.17⅜
Copal Manila,	.13½	.15½	.13½	.15½	.14	.14½
Copal Pontianak, bold (A) lb.	...	.23⅜	...	.23⅜	.22⅜	.22⅞
Ester ....lb.	.09½	.12	.09½	.12	.08½	.10
Karaya, bbls, bxs, drs ...lb.	.14	.36	.14	.36	.14	.33

ABBREVIATIONS—Anhydrous, anhyd; bags, bgs; barrels, bbls; carboys, cbys; carlots, c-l; less-than-carlots, lcl; drums, drs; kegs, kgs; powdered, powd; refined, ref'd; tanks, tks; works, f.o.b., wks.

h Lowest price is for pulp; highest for high grade precipitated; *i* Crystals $6 per ton higher; USP, $15 higher in each case;

Current Prices

Gums
Salt Cake

		Current Market		1943 Low	1943 High	1942 Low	1942 High
Kauri, N Y (A)							
Brown XXX, bgs	lb.	...	.77	...	.77	.60	.77
Pale XXX	lb.	...	.65¼	...	.65¼	.61	.66
No 3	lb.	...	.22	...	.22	.17¾	.22
Sandarac, cs	lb.	...	.97½	...	.97½	.95	1.10
Tragacanth, No. 1, cases	lb.	4.00	4.25	4.00	4.25	3.50	4.00
No. 3	lb.	1.10	1.20	1.10	1.20	1.10	1.20
Yacca, bgs (*PC*)	lb.	.06	.07¼	.06	.07¼	.06	.07¼
Hydrogen Peroxide, cbys	lb.	.15½	.18½	.15½	.18½	.16	.18½
Iodine, Resublimed, jars	lb.	2.00	2.10	2.00	2.10	...	2.00
Lead Acetate, cryst. bbls	lb.		.12½		.12½	.12	.13¼
Arsenate, bg, c-l	lb.	.11½	.12	.11½	.12	.11	.12
Nitrate, bbls	lb.	...	.12½	...	.12½	.11	.14
Red, dry, 95% Pb_3O_4, lcl	lb.	.09	.10¾	.09	.10¾	.09	.10¾
97% Pb_3O_4, bbls delv	lb.	.09¼	.11	.09¼	.11	.09¼	.09½
98% Pb_3O_4, bbls delv	lb.	.09½	.11¼	.09½	.11¼	.09½	.10½
White, bbls, lcl	lb.	.08¼	.08¾	.08¼	.08¾	...	.07½
Basic sulfate, bbls, lcl	lb.	.07¼	.08	.07¼	.08	.06½	.07½
Lime, Chem., wks, bulk	ton	6.25	13.00	6.25	13.00	7.00	13.00
Hydrated, f.o.b. wks	ton	8.50	16.00	8.50	16.00	8.50	16.00
Litharge, coml, delv, bbls	lb.	.08	.09¾		.08	.079	.08
Lithopone, ordi., (*PC*), bgs	lb.	.04½	.04¾	.04½	.04¾	...	.04¼
Magnesium Carb, tech, wks	lb.	.06¼	.09¾	.06¼	.09¾	...	.06¼
Chloride flake, bbls, wks c-l	ton	...	32.00	...	32.00		32.00
Manganese, Chloride, bbls	lb.	.14	nom.	.14	nom.	.13	.14
Dioxide, tech bgs, lcl	ton	...	74.75	...	74.75	...	74.75
Methanol, pure, nat, drs	gal *l*	.63	.76	.63	.76	.55½	.61½
Synth, drs cl	gal. *m*	.34½	.40½	.34½	.40½	.34½	.40½
Methyl Acetate, tech tks	lb.	.06	.07	.06	.07	.06	.07
C.P. 97-99%, tks, delv	lb.	.09½	.10½	.09½	.10½	.09½	.10½
Chloride, 90 lb cyl	lb.	.31	.40	.31	.40	.32	.40
Ethyl Ketone, tks, frt all'd	lb.	...	.08	...	.08	...	.08
Naphtha, Solvent, tks	gal.	...	.27	...	.27	...	.27
Naphthalene, crude, 74°, wks tks	lb.	...	.0275	...	.0275	...	...
Nickel Salt, bbls, NY	lb.	.13	.13½	.13	.13½	.13	.13½
Nitre Cake, blk	ton	...	16.00	...	16.00	...	16.00
Nitrobenzene, drs, wks	lb.	.08	.09	.08	.09	.08	.09
Orthoanisidine, bbls	lb.	...	.70	...	.70	...	.70
Orthochlorophenol, drs	lb		.32	...	.32	...	.32
Orthodichlorobenzene, drms	lb.	.07	.08	.07	.08	.06	.07½
Orthonitrochlorobenzene, wks	lb	.15	.18	.15	.16	.15	.18
Orthonitrotoluene, wks	lb		.09	...	.09	...	.09
Para aldehyde, 98%, wks	lb.	...	.12	...	.12	...	.12
Chlorophenol, drs	lb	...	.32	...	.32	...	.32
Dichlorobenzene, wks	lb	.11	.15	.11	.15	.11	.12
Formaldehyde, drs, wks (*FP*)	lb	.23	.24	.23	.24	.23	.24
Nitroaniline, wks, kgs	lb.	.43	.45	.43	.45	...	.45
Nitrochlorobenzene, wks	lb		.15		.15		.15
Penetaerythritol, tech, del	lb.	.33½	.35½	.33½	.35½	.33½	.35½
Toluenesulfonamide, bbls	lb	...	.70	...	.70	...	.70
Toluidine, bbls, wks	lb.	...	.48	...	.48	...	.48

PETROLEUM SOLVENTS AND DILUENTS

		Current Market		1943 Low	1943 High	1942 Low	1942 High
Lacquer diluents, tks, East Coast	gal.	...	.11	...	.11	...	.11
Naphtha, V.M.P., East tks, wks	gal.	...	.11	...	.11	.10½	.11
Petroleum thinner, 43-47, East, tks, wks	gal.	.08¾	.09½	.08¾	.09½	.08¾	.09½
Rubber Solvents, stand grd, East, tks, wks	gal.	...	.11	...	.11	.10½	.11
Stoddard Solvents, East, tks, wks	gal.	...	.09½	...	.09½	...	.09½

		Current Market		1943 Low	1943 High	1942 Low	1942 High
Phenol, U.S.P., drs (A)	lb.	.10½	.13¼	.10½	.13¼	.12½	.13
Phthalic Anhydride, cl and lcl, wks (A)	lb.	.13	.14	.13	.14	.14½	.15½
Potash, Caustic, wks, sol	lb.	.06¼	.06¾	.06¼	.06¾	.06¼	.06¾
flake	lb.	.07	.07½	.07	.07½	...	.07
liquid, tks	lb.		.0275		.0275		.0275
dms, wks	lb.	.03	.03½	.03	.03½	.03	.03½
Potassium Bichromate casks *(FP)	lb.	.09⅛	.10	.09⅛	.10	...	.09⅛
Bisulfate, 100 lb kgs	lb.	.15½	.18	.15½	.18	.15½	.18
Carbonate, hydrated 83-85% calc	lb.	.05½	.05¾	.05½	.05¾	.06½	.06¾
Chlorate crys, kgs, wks (A)	lb.	.11	.13	.11	.13	nom.	.11
Chloride, crys, tech, bgs, kgs	lb.	.08	nom.	.08	nom.	.08	nom.
Cyanide, drs, wks	lb.	...	.55	...	.55	...	.55
Iodide, bots., or cans	lb.	1.44	1.48	1.44	1.48	1.44	1.48
Muriate, bgs, dom, blk unit Per Unit K_2O	ton	.53½	.56	.53½	.56	.56	.58
Permanganate, USP, wks (*FP*) dms	lb.	.20½	.21	.20½	.21	.19¾	.21
Sulfate, 90% basis, bgs	ton	...	36.25	...	36.25	...	36.25
Propane, group 3, tks (*PC*)	gal.	...	.03¾	...	.03¾	.02¾	.03¾
Pyridine, ref., drms	lb.	...	.45½	...	.45½	...	.46
R Salt, 250 lb bbls, wks	lb.	...	.55	...	.55	...	.55
Resorcinol, tech., drms, wks	lb.	.68	.75	.68	.75	.68	.74
Rochelle Salt, cryst	lb	.43½	.47	.43½	.47	...	.43½
Salt Cake, dom. blk wks	ton	...	15.00	...	15.00	...	15.00

l Producers of natural methanol divided into two groups and prices vary for these two divisions; *m* Country is divided in 4 zones, prices varying by zone.

* Spot price is ⅛c higher.

	Current Market		1943 Low	1943 High	1942 Low	1942 High
Saltpetre, grn, bbls ...100 lb.	8.20	8.60	8.20	8.60	...	8.20
Shellac, Bone dry bbls lb. r	.42½	.46	.42½	.46	.39	.42½
Silver Nitrate, 100 oz, bots ....oz.	...	.32⅛	...	.32⅛	.26⅞	.32⅛
Soda Ash, 58% dense, bgs, c-l, wks 100 lb.	...	1.15	...	1.15	.	1.15
58% light, bgs cl ...100 lb.	...	1.13	...	1.13	1.05	1.13
Caustic, 76% grnd drms ....100 lb.	...	2.70	...	2.70	...	2.70
76% solid, drms ..100 lb.	...	2.30	...	2.30	...	2.30
Liquid, sellers tks 100 lb.	...	1.95	...	1.95	...	2.00
Sodium Acetate, 60% tech, powd, flake, bbls, wks lb.	.05	.06	.05	.06		.05
Benzoate, USP dms ....lb.	.46	.52	.46	.52	.46	.50
Bicarb, bbl, wks .. 100 lb.	1.70	2.05	1.70	2.05	1.70	1.85
Bichromate, cks, wks (*FP*) lb.	...	.07¾	...	.07¾	...	.07⅜
Bisulfite powd, bbls, wks ....100 lb.	3.00	3.60	3.00	3.60	3.00	3.10
35-40% bbls, wks ..100 lb.	1.40	1.65	1.40	1.65	1.35	1.80
Chlorate, bgs, wks (A) lb.	.	.06¼	.	.06¼	.	.06¼
Cyanide, 96-98%, wks ..lb.	.14½	.15	.14½	.15	.14	.15
Fluoride, 95%, bbls, wks lb.	.07¼	.08¼	.07¼	.08¼	...	.08
Hyposulfite, cryst, bgs, cl, wks ....100 lb.	...	2.25	...	2.25	...	2.45
Metasilicate, gran, bbl, wks ....100 lb.	2.50	3.55	2.50	3.55	...	2.50
Nitrate, imp, bgs (A) ton	...	33.00	...	33.00	...	29.35
Nitrite, 96-98% dom, cl. lb.		.06¾		.06¾	...	.06¾
Phosphate, di- wks ..100 lb.	6.00	7.25	6.00	7.25	...	...
cryst, bgs, c-l 100 lb.	2.55	2.70	2.55	2.70	2.55	2.70
Tri-bgs, cryst, wks 100 lb.	2.70	3.45	2.70	3.45	2.70	2.85
Prussiate, yel, bbls, wks lb.	.10	.11	.10	.11		.11
Pyrophosphate, bgs wks c-l lb.	.0528	.0610	.0528	.0610	.053	.06
Silicate, 52°, drs. wks 100 lb.	1.40	1.80	1.40	1.80	...	1.70
40°, drs, wks, c-l 100 lb.	.	.80	..	.80	...	...
Silicofluoride, bbls NY ..lb.	.06	.12	.06	.12	.09	.15
Sulfate, Anhyd, bgs 100 lb.	1.70	1.90	1.70	1.90	1.70	1.90
Sulfide, c-l, bbls, wks ..lb.	.	2.40	..	2.40	...	2.40
Solid, bbls, c-l, wks ..lb.	3.15	3.90	3.15	3.90	...	3.15
Sulfite, powd, bbls, wks lb.	.05¼	.06	.05¼	.06	...	.05¼
Starch, Corn, Pearl, bgs ....100 lb.	...	3.46	...	3.46	...	3.10
Potato, bgs, cl ....lb.	...	.0637	...	.0637	.061	.0637
Rice, bgs .... lb.	.09½	.10¼	.09½	.10¼	.09	.10
Sweet Potato, bgs ..100 lb.	no stocks		no stocks		no stocks	
Sulfur, crude, f.o.b. mines ton	...	16.00	...	16.00	...	16.00
Flour, USP, precp, bbls, kgs ....100 lb.	.18	.30	.18	.30	...	...
Roll, bbls ...... 100 lb.	2.40	2.90	2.40	2.90	2.40	2.70
Sulfur Dioxide, liquid, cyl. lb.	.07	.08	.07	.08	.07	.09
tks, wks ....lb.	.04	.06	.04	.06	.04	.06
Talc, crude, c-l, NY ....ton	.	13.00	.	13.00	12.50	24.50
Ref'd, c-l, NY ......ton	13.00	21.00	13.00	21.00	17.25	19.25
Tin, crystals, bbls, wks ...lb.	no stocks		no stocks		no stocks	
Metal, (*PC*) (A) ......lb.	...	.52	...	.52	...	.52
Titanium Dioxide (*PC*) ..lb.	.15	.15¾	.15	.15¾	...	.14½
Toluol, drs, wks (*FP*) (A) gal.	...	.33	...	.33	...	.33
tks, frt all'd (*FP*) ....gal.	...	.28	...	.28	...	.28
Tributyl Phosphate, dms lcl, frt all'd ....lb.	...	.47	...	.47	...	.47
Trichlorethylene, dms, wks lb.	.08	.09	.08	.09	...	.08
Tricresyl phosphate (*FP*) lb.	.24	.54½	.24	.54½	.25	.31
Triethylene glycol, dms lcl lb.	...	.26	...	.26	...	.26
Triphenyl Phos, bbls (*FP*) lb.	.31	.32	.31	.32	.31	.32
Urea, pure, cases ......lb.	...	.12	...	.12	...	.12
Wax, Bayberry, bgs .....lb.	.25	.26	.25	.26	.18	.20
Bees, bleached, cakes ...lb.	...	.60	...	.60	.58	.61
Candelilla, bgs ....lb.	.38	.48	.38	.48	.33	.38
Carnauba, No. 1, yellow, bgs, ton ....lb.	.83¼	.93¼	.83¼	.93¼	.83¼	.89
Xylol, frt all'd, tks, wks..gal.	...	.27	...	.27	...	.27
Zinc Chloride fused, wks..lb.	.05	.0535	.05	.0535	...	.05
Oxide, Amer, bgs, wks lb.	.07¼	.07½	.07¼	.07½	...	.07¼
Sulfate, crys, bgs, ..100 lb.	3.60	4.35	3.60	4.35	3.60	3.65

Oils and Fats

	Current Market		1943 Low	1943 High	1942 Low	1942 High
Babassu, tks, futures ....lb.	...	.111	...	.111	no prices	
Castor, No. 3, bbls ......lb.	.13¾	.14¼	.13¾	.14¼	.12½	.13¾
China Wood, drs, spot NY lb.	...	.39	...	.39	.39	.40⅛
Coconut, edible, drs NY ..lb.	...	.0985	...	.0985	...	...
Cod Newfoundland, dms..gal.	...	.90	...	.90	.85	.90
Corn, crude, tks, wks ....lb.	...	.12¾	...	.12¾	.12⅛	.12⅜
Linseed, Raw, dms, c-l ...lb.	...	.1530	...	.1530	.117	.143
Menhaden, tks, Baltimore gal.	...	.089	...	.089	.63¾	.666
Light pressed, drs .. lb.	.1305	.1307	.1305	.1307	.11	.139
Oiticica, liquid, dms .....lb.	...	.25	...	.25	...	...
Oleo, No. 1, bbls, NY ..lb.	.13¾	nom.	nom.	.13¼	...	.13¼
Palm, Niger kernel, cks bulk .. lb.	...	.0825	...	.0825	.0925	...
Peanut, crude, tks, f.o.b. wks ....lb.	...	.18	...	.18	.12⅞	.13
Perilla, crude dms, NY (A) lb.	...	.245	...	.245	...	.246
Rapeseed, denat, bulk ....lb.	...	.1150	...	.1150	...	...
Red, dms lb.	.13¼	.14¼	.13¼	.14¼	.11¾	.143
Soy Bean, crude, tks, wks lb.	..	.1175	...	.1175	.12¼	nom.
Tallow, acidless, bbls . lb.	...	.14¼	...	.14¼	...	
Turkey Red, single, drs ..lb.	.10	.14½	.10	.14½	...	.08¾

r Bone dry prices at Chicago 1c higher; Boston ½c; Pacific Coast 2c; Philadelphia deliveries f.o.b N. Y., refined 6c higher in each case.

The Chemical MARKET PLACE

(CLASSIFIED ADVERTISEMENTS)

Local Stocks
Chemicals • Equipment

Raw Materials
Specialties • Employment

National Roster

(Continued from page 683)

Local Board Memoranda 115 and 115-B by directing the local United States Employment Service offices to call upon the National Roster of Scientific and Specialized Personnel for advice in the professional occupations in all necessary cases.

The Roster's recommendation will be sent directly to the local office of the United States Employment Service for transmittal to the local Selective Service board. Roster registrants and employers of professional and scientific personnel should familiarize themselves with these procedures, particularly Local Board Memorandum 115-B, so that they may assist the agencies concerned in expediting the operation of all steps in these procedures of the War Manpower Commission. The fact that a man is registered with the National Roster may be reported by the employer on the Selective Service Form 42 or 42-A or in any other statement which it may be necessary to submit to the registrant's local board. In this connection it should especially be noted that the new regulations allow thirty days only after the case has been referred by the local Selective Service board to the local United States Employment Service office for the return of the case to the local board indicating the decision made and the action taken by the War Manpower Commission.

These new procedures were adopted so that there would be uniformity in the making of initial referrals for information and recommendations by the local Selective Service boards to the designated War Manpower Commission agency—in this case the local United States Employment Service office—and also because it was believed that referrals by the local Selective Service boards should be made only in those cases in which the boards did not believe that occupational deferments should be granted.

In the event a professionally qualified employee considered to be working in an essential activity is retained in Class I-A and scheduled for induction by his local board after the provisions of Local Board Memorandum 115-B have been complied with, you are urged to advise the Roster of that fact immediately. In furnishing this advice, please give the registrant's name, address, local Selective Service board address, order number, name and address of employer, description of present job, and Roster registration number. If necessary, further discussion of the case will be had with the National Headquarters of the Selective Service System.

These new procedures also have important implications concerning the placement and transfer of professional and scientific workers. It should be pointed out that these procedures apply to new civilian college graduates in these areas who plan to begin work on leaving college. The details of these new procedures, particularly as they concern the securing of certificates of availability, may be obtained from your nearest local United States Employment Service office.

Attention is also called to the fact that the new provisions regarding placement and transfer may differ from locality to locality depending upon the local differences as embodied in employment stabilization plans.

Roster registrants and employers of professional and scientific personnel should familiarize themselves with all local and national regulations by consulting the nearest United States Employment Service office.

Irwin With National Dairy

James W. Irwin, who has been executive assistant to the president of the Monsanto Chemical Co., has been named to the executive staff of the National Dairy Products Co. Mr. Erwin who has already assumed his new post, will perform administrative duties.

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INDEX TO ADVERTISERS

"WE"-EDITORIALLY SPEAKING

An inspiring highlight at the impressive inauguration of Wallace P. Cohoe as president of the Society of Chemical Industry was the talk on "Constructive Ideology" by Sir Gerald Campbell, British Minister at Washington. With a sparkling sense of humor showing through his sincerity Sir Gerald made his audience proud of being connected with the fields of science and technology.

Sir Gerald's statement that "thanks to the inventive genius of man, we are all coming to live more closely together whether we like it or not, and the only way to like it—to enjoy living in each other's back yards—is to develop a more international outlook," is a significant one. It may well be that the close scientific ties built up among the United Nations during the war will find expression in international scientific and professional societies. That an international outlook is being developed was evidenced at the dinner by the honors paid to two distinguished chemists, Dr. Te Pang-Hou of China and Alexei Bach, Soviet biochemist.

On the lighter side, Dr. J. V. N. Dorr made an interesting comment after the impressive S.C.I. dinner. Said Dr. Dorr: "The Dorrs and Cohoes attended a Society of Chemical Industry meeting in Exeter in happier days, 1939, and with the two *beards* somewhat alike, we mystified the English public."

Packaging and shipping are among the foremost problems in marketing today. In the chemical industry the container problem is far more complex than it is in other industries because of the wide variety of products produced from a gram to a carload, and because of the hazardous nature of these products.

The art of packaging has progressed rapidly in the past few years and thus it is with pleasure and anticipation that we welcome T. Pat Callahan to the contributing staff of CHEMICAL INDUSTRIES. Pat is a recognized expert in this field, being Supervisor of Containers for Monsanto Chemical Company and a member of several Containers Committees of the Manufacturing Chemists' Association. We believe that readers who follow his column regularly will derive much help in the rapidly progressing art of packaging.

Possibly a good sign of the times was the recent public search for a **$100,000** a year man to take an $8000 job as an OPA executive in New York. According to one announcement the man sought was, "one who has made common stock pay dividends, and someone who is public-spirited enough to step out and take the heat."

This sign seems to be pointing away from the idea that anyone who had made a success in business or industry must be a reactionary, incompetent, or un-American. When the chips are down we find that business and industrial management usually comes through.

Gus Egloff of Universal Oil Products writes: "While in New York City last Saturday I met Walter M. Ralph, who sang a new stanza to "The Engineer's Song" as follows:

"Who twists the hydrocarbons into
Structures strange and queer,
Who looks at coal-tar chemistry
With a most disdainful sneer,
Who revamps his whole technology
A dozen times a year.
It's the polymerizing, catalyzing
Petroleum engineer!"

We thought we'd publish this so that any of our petroleum engineers will also be in the sun and glory of the "Engineer's Song."

The other day we received a photograph from the Pennsylvania Salt Manufacturing Company, showing its new Whitemarsh Laboratories, converted from the former residence of E. T. Stotesbury near Philadelphia. Just one look at this magnificent mansion and spacious landscaped grounds and we were almost ready to send in our application for a job with Penn Salt.

Attendance at several scientific and technical meetings in New York during the past three weeks or so confirmed our thoughts that more or less specific post-war plans can not be put off much longer. The complexity of the problems of contract cancellation and adjustment, capital on which to keep running during the reconversion period and many other similar questions kept coming up. It is unfortunate that mention of post-war plans seems to be avoided because in some way the feeling has spread that this means people feel the war is over and will let down their productive efforts.

Now that industry is tooled up and raw materials flowing in a pretty smooth groove for war production, we don't think that post-war planning can do much harm to the war effort, and we do think that reconversion is going to be as big if not a bigger job than conversion, and that it will take foresight and planning to get us back to the kind of peace time economy and life that we're fighting the war to preserve.

Fifteen Years Ago

From Our Files of November, 1928

Grasselli Chemical Co. consolidates with E. I. duPont de Nemours & Co., Inc. Grasselli to handle all heavy chemicals, duPont other products.

Monsanto Chemical Works, Inc. plans to acquire the 50 per cent Graesser interest in Graesser-Monsanto Chemical Works, Ltd., England, at a cost of $917,000, which would give Monsanto 100 per cent ownership.

Dr. Edward G. Acheson, inventor of Acheson graphite, presents a prize fund of $25,000 to the American Electrochemical Society.

The American dye industry supplied approximately 94 per cent of the requirements of the United States in 1927 and produced also an exportable amount of more than 26,000,000 pounds of dyestuffs, according to the Eleventh Annual Census of Dye and Other Synthetic Organic Chemicals. In calling attention to the marked progress of the industry, the report explains that in 1913 only 13 per cent of the dyes consumed in this country were produced here.

P. Samuel Rigney, secretary, Roessler & Hasslacher Chemical Co., dies suddenly October 26, aged 56, while on a business trip to Niagara Falls.

James W. Elms, assistant general manager, Paint, Lacquer & Chemicals Department, E. I. duPont de Nemours & Co., Inc., dies October 18, in Paris, France, while on a business trip for the company.

Dr. H. J. Rose is presented with Grasselli Medal for 1928 at joint meeting of American section, Society of Chemical Industry; New York section, American Chemical Society; and Societe de Chimie Industrielle.

Growth of Germany's chemical exports the past several years is believed to have brought them to their former pre-war volume, according to A. H. Swift, Chemical Division Department of Commerce.

PART 2: PATENTS AND TRADEMARKS

Abstracts of U. S. Chemical Patents

A Complete Checklist Covering Chemical Products and Processes

From Official Gazette—Vol. 553, No. 5—Vol. 554, Nos. 1, 2, 3—p. 450

*Resins, Plastics**

Polymerizing unsaturated resinophoric compounds from the group consisting of vinyl ketones, acroleins, acrylate esters, acrylic acids, acrylonitriles and styrenes. No. 2,326,736. David Adelson and Hans Dannenberg to Shell Development Co.

Molding powder comprising 10 parts of ethyl cellulose having an ethoxyl content from about 41% to about 51% and from 1 to 10 parts of hydrogenated rosin. No. 2,326,810. David Wiggam to Hercules Powder Co.

Brush comprising, in combination, a plastic mass substantially unaffected by hot water comprising: ethyl cellulose having an ethoxyl content between about 41% and about 51%, glycerol ester of hydrogenated rosin, substantially non-volatile liquid refined mineral oil, water resistant softening modifier miscible with said oil, and a bristle tuft mounted in said plastic mass. No. 2,326,811. David Wiggam and William Koch to Hercules Powder Co.

Injection molding powder. No. 2,326,812. David Wiggam and William Koch to Hercules Powder Co.

Improving the grinding, mixing and refining of plastics, and similar rubber-like material which consists in working these substances on mills in which the rollers have diameters not exceeding one-half meter. No. 2,326,927. Victor Conrad.

Plasticized composition comprising a ketone-soluble synthetic plastic plasticized with a branched chain, saturated ketone. No. 2,327,007. Franklin Bent and Francis Byrne to Shell Development Co.

Producing the diethylene glycol ester of a rosin. No. 2,327,009 Wyly Billing to Hercules Powder Co.

Improving hydrogenated rosin. No. 2,327,132. Jacob Schantz to Hercules Powder Co.

Method of polymerizing rosin and rosin esters. No. 2,327,165. Joseph Borglin to Hercules Powder Co.

Forming polyvinyl acetal resin sheets. No. 2,327,627. Gustavus Esselen to Monsanto Chemical Co.

Plastic composition for laminated glass interlayers. No. 2,327,652. Lucas Kyrides to Monsanto Chemical Co.

Method which comprises forming into a predetermined shape a mass of a polyvinyl compound. No. 2,327,872. Joseph Dahle to Pro-phy-lac-tic Brush Co.

*Rubber**

Vulcanization of rubber. No. 2,325,735. Edward Blake to Monsanto Chemical Co.

Vulcanized product comprising rubber, an accelerator, and from about 1% to about 3% hydrogenated rosin based on the weight of the rubber employed, the hydrogenated rosin acting as an activator for the accelerator. No. 2,325,737. Clyde Boys to Hercules Powder Co.

Making sponge rubber floor covering material. No. 2,325,903. George Blair and Virgil Bodle to Mishawaka Rubber & Woolen Manufacturing Co.

Softener for synthetic rubber comprising di-2-ethyl-hexyl phthalate and a rubbery polymer of a conjugated butadiene. No. 2,325,946. Benjamin Garvey, Jr. to The B. F. Goodrich Co.

Softener for synthetic rubber. No. 2,325,947. Benjamin Garvey to The B. F. Goodrich Co.

Softener for synthetic rubber. No. 2,325,948. Benjamin Garvey, Jr. to The B. F. Goodrich Co.

Softening synthetic rubber. No. 2,325,979. Donald Sarbach to The B. F. Goodrich Co.

Softener for synthetic rubber chlorinated triaryl phosphate. No. 2,325,982. Donald Sarbach to The B. F. Goodrich Co.

Softener for synthetic rubber. No. 2,325,983. Donald Sarbach to The B. F. Goodrich Co.

Softener for synthetic rubber. No. 2,325,985. Waldo Semon to The B. F. Goodrich Co.

Depositing rubber of uniform thickness upon formers and stripping the rubber deposit therefrom. No. 2,326,160. Stephen Neiley and Emile Habib to Dewey & Almy Chemical Co.

Vulcanization accelerator for rubber. No. 2,326,555. Arthur Neal and Bernard Sturgis to E. I. du Pont de Nemours & Co.

4,4,6-trimethyl-2-thio-tetrahydro-1,3,2-oxazine as an accelerator of vulcanization for rubber. No. 2,326,733. Harry Fisher to U. S. Industrial Alcohol Co.

Process and material for thickening latex and like materials. No. 2,326,956. Gerry Mack to Advance Solvents & Chemical Corp.

Vulcanization of rubber. No. 2,327,052. Roger Mathes to The B. F. Goodrich Co.

Purifying latex which comprises adding to a latex preserved with .2 to 3 per cent formaldehyde, sufficient alkaline material to raise the pH to between 6.5 and 11. No. 2,327,115. Chester Linscott and John McGavack to United States Rubber Co.

Producing a rubber hydrochloride film of irregular surface. No. 2,327,170. William Calvert to Wingfoot Corp.

Forming a rubber impregnated fibrous material. No. 2,327,573. William Walsh to Burlington Mills, Inc.

Method of heat-sterilizing fresh latex and product thereof. No. 2,327,939. William Stewart to The B. F. Goodrich Co.

Method of preserving latex and product thereof. No. 2,327,940. William Stewart to The B. F. Goodrich Co.

*Textiles**

Thermoplastic adhesive composition for union with textile material. No. 2,325,963. de Forest Lott, Henry Grinsfelder, and Edward Hamway to Textileather Corporation.

Method of brominating wool. No. 2,326,021. Ralph Ericcson to Westvaco Chlorine Products Corp.

Artificial yarn and process of producing same. No. 2,326,043. William Liebig.

Preparing laminating fabric for adhesively uniting the components in a composite fabric. No. 2,326,121. Joseph Bludworth to Celanese Corporation of America.

Preparing a laminating fabric for adhesively uniting the components in a composite fabric. No. 2,326,128. Camille Dreyfus and George Schneider to Celanese Corporation of America.

Preparation of laminating fabric. No. 2,326,189. William Whitehead to Celanese Corporation of America.

Preparation of laminating fabrics. No. 2,326,190. William Whitehead to Celanese Corporation of America.

Increasing the extensibility of artificial filaments, threads, yarns and like materials containing organic derivatives of cellulose, which have been stretched to increase their tenacity. No. 2,326,842. Henry Dreyfus to Celanese Corp. of America.

Production of staple fibers of varying cross-sectional areas from synthetic linear polyamide. No. 2,327,087. Paul Austin to E. I. du Pont de Nemours & Co.

Treatment of textile fiber. No. 2,327,160. Osborne Bacon to E. I. du Pont de Nemours & Co.

Forming stapled and crimped textile fibers from a continuous uncrimped filament of a water-insoluble vinyl resin. No. 2,327,460. Edward Rugeley to Carbide and Carbon Chemicals Corp.

Manufacture of high tenacity artificial filaments and fibers having an elongation above 10%, from viscose. No. 2,327,516. Heinrich Fink and Gaston Plepp.

Process producing adherent water insoluble dressing on fabrics with water insoluble lower alkyl cellulose. No. 2,327,912. Leon Lilienfeld, deceased. Antonie Lilienfeld, administratrix to Lilienfeld Patents, Inc.

*Water, Sewage Sanitation**

Treating alkaline water comprising first treating the raw water with a hydrogen zeolite, subsequently adding a coagulant. No. 2,325,-675. Hilding Gustafson to Infilco Incorporated.

Stabilizing water containing calcium bicarbonate. No. 2,325,679. Walter Hughes to Infilco Incorporated.

Treating sewage which comprises sedimenting the putrefiable sludge from the liquid, subjecting the putrefiable sludge, while confined in a container open to the air and protected from the acinitic rays of the sun, to the digestive action of a microflora in which aerobic bacteri, fungi and Protozoa predominate. No. 2,326,303. Frank Moerk and George Eisenberg, one-fourth to Edward Hyland and one-fourth to A. M. Stackhouse.

Softening hard water the steps comprising dissolving tetrasodium pyrophosphate in the water. No. 2,326,950. Raymond Kepfer to E. I. du Pont de Nemours & Co.

Preventing acidic corrosion of surfaces in sewers. No. 2,326,968. Richard Pomeroy one-half to Fred Bowlus.

Water-softening agent selected from the group consisting of pyrimidine, uracil, thymine, cytosine, purine, xanthine, guanine and adenine. No. 2,327,323. Wilber Teeters to E. I. du Pont de Nemours & Co.

Agricultural Chemicals

Insecticide containing as its essential active ingredient an extract of prickly ash, Zanthoxylum clava-herculis L. No. 2,328,726. Frederick LaForge and Herbert Haller to Claude R. Wickard, Secretary of Agriculture of the U.S.A.

Insecticidal composition of matter. No. 2,329,074. Paul Muller to J. R. Geigy A.G.

Defoliating cotton plants which includes the step of dusting the plant when near maturity with calcium cyanamid at the rate of from 10 to 100 pounds per acre. No. 2,329,680. Thomas Wilkerson to American Cyanamid Co.

Preservative treatment of wood by a method which comprises subjecting the wood for a period of approximately 3½ hours while submerged in liquid preservative within a sealed chamber under a pressure of approximately 200 lbs. per sq. in. and at a temperature of approximately 210°F. No. 2,329,774. Emil Lefkof.

Insecticide preparation containing an organic plant toxicant selected from the group consisting of rotenone, nicotine, nicotine sulfate, and extracts of Derris, cube, timbo, devil's shoe string, pyrethrum flowers and tobacco in solution in a composite oil produced by destructive distillation of rubber. No. 2,329,861. William ter Horst to United States Rubber Co.

* Continued from last month (Vol. 553, Nos. 1, 2, 3, 4).

Preventing and controlling the growth of fungi on plant material and of disinfecting the same which comprises applying thereto a symmetrical organic mercury compound. No. 2,329,884. Morris Daskais to Research Corp.

Cellulose

Simultaneously manufacturing pulp and hydrogenated products from lignocellulose. No. 2,328,749. Earl Sheerard and Elwin Harris to Henry A. Wallace, Secretary of Agriculture of the U.S.A.

Production of organic acid esters of cellulose of improved characteristics which comprises esterifying cellulose by means of a lower fatty acid anhydride in the presence of an inorganic acid catalyst. No. 2,329,704. Camille Dreyfus and Robert Rowley to Celanese Corp. of America.

Organic esters of cellulose. No. 2,329,705. Camille Dreyfus and Robert Rowley to Celanese Corp. of America.

Preparation of organic acid esters of cellulose of increased stability. No. 2,329,706. Camille Dreyfus and Mervin Martin to Celanese Corp. of America.

Preparation of organic esters of cellulose of increased stability. No. 2,329,717. Clifford Haney and Mervin Martin to Celanese Corp. of America.

Cellulose esters. No. 2,329,718. Clifford Haney and Mervin Martin to Celanese Corp. of America.

Production of ripened cellulose esters. No. 2,329,730. George Seymour and Blanche White to Celanese Corp. of America.

Manufacturing a porous regenerated cellulose structure having fixed accessible pores. No. 2,329,983. Emil Czapek.

Ceramics

Producing ceramic insulating material, including mixing powdered magnesium-beryllium titanate, titanium dioxide and beryl. No. 2,328,410. Godshalk Berge to Johnson Laboratories, Inc.

Improving the physical properties of ceramic cements with stable colloidal solution of silica. No. 2,329,589. Willard Carter to National Aluminate Corp.

Seal comprising completely degasified hard glass fused directly to silica. No. 2,330,072. George Meister to Westinghouse Electric & Mfg. Co.

Chemical Specialties

Transparent pressure sensitive adhesive tape wound upon itself in roll form. No. 2,328,057. Robert Coulter to Minnesota Mining & Manufacturing Co.

Pressure-sensitive adhesive sheet comprising a non-fibrous hydrophilic cellulosic film backing having a smooth, dense, non-porous surface thereof to which is united a contacting primer film formed of the dried deposition product of an aqueous emulsion of latex and hydrophilic protein glue. No 2,328,066. Richard Drew to Minnesota Mining & Manufacturing Co.

Treating a colloidal drilling fluid which comprises adding thereto a composition of pH between 8.0 and 9.5 and substantially consisting of tetrasodium pyrophosphate ($Na_4P_2O_7$), an acid pyrophosphate ($N_2H_2P_2O_7$), borax and boric acid. No. 2,328,426. Friedrich Daniel to Hornkem Corporation.

Cutting oil comprising a mineral oil base of suitable viscosity with which is mixed from several per cent up to about ten per cent of a light saturated distillate of a fatty oil and containing dissolved therein elemental sulfur. No. 2,328,620. Charles Crawford.

Core oil comprising naphthenic extract about a third by weight, a drying or semi-drying oil about an eighth by weight, together with a drying accelerator, the balance substantially being a petroleum solvent serving as a diluent vehicle. No. 2,328,622. Charles Crawford.

Heat insulating material consisting of a vitrified mass of particles of exfoliated vermiculite, siliceous binding material, and green oxide of chromium. No. 2,328,644. Arthur Happe, one-half to Herman Sperlich.

Combined deodorant and germicide and process of making same. No. 2,328,690. William Steele to The Solvay Process Co.

Manufacturing mineral wool fibers from molten raw materials. No. 2,328,714. Daniel Drill and Carlton Davis to American Rock Wool Corporation.

Soluble oil comprising a petroleum oil, mahogany sulfonates, a water-soluble soap, an alkylolamine in amounts sufficient to impart anti-rusting properties and an alkali metal hydroxide. No. 2,328,727. Theodore Langer to The Texas Co.

Treating fatty acid soaps which comprises heating an aqueous solution of a fatty acid soap to partially vaporize the water therein. No. 2,328,892. Robert Colgate, Robert Brandt and Harold Allen to Colgate-Palmolive-Peet Co.

Plastic filler composition for oiled wood and the like comprising a body made up of hard wall plaster, whiting, and a binder made up of a shellac solution and acetone. No. 2,328,894. Edgar Cranmer.

Attrition product including at least one member of flat fabric; and at least some extruded plastic filaments woven in said flat fabric and having abrasive commingled and extruded in said filaments. No. 2,328,998. George Radford.

Dry material for use in making joints of pipes or the like, comprising substantially 10% by weight of asbestos fibre, 70% by weight of powdered cement, between 8% and 12% by weight of a powdered alkali carbonate and between 8% and 12% by weight of powdered hydrated lime. No. 2,329,014. Charles Taylor.

Permanently mastic luting material comprising a mineral oil base, and one substance selected from the group consisting of bauxite and bauxite tailings. No. 2,329,113. William Ferguson, Paul Sussenbach and Cyril Smith to Presstite Engineering Co.

Improving the cohesion of and for impermeabilizing and consolidating, grounds and other earthy and stony masses and structures, comprising impregnating the masses with a suspension of a swellable substance in a liquid carrier. No. 2,329,148. Gerrit van Leeuwen to Shell Development Co.

Manufacturing a metal bonded abrasive article. Reissue No. 22,873. Raymond Benner and Romie Melton to The Carborundum Co.

Manufacturing a metal bonded abrasive article. Original No. 2,193,-265. Raymond Benner and Romie Melton to The Carborundum Co.

Lubricant composition comprising a hydrocarbon lubricating oil and in admixture therewith the product obtained by refluxing from two to six parts of perchloromethylmercaptan with one part of sulfur. No. 2,329,324. Henry Berger and Francis Seger to Socony-Vacuum Oil Co., Inc.

Hydrocarbon oil composition comprising a major proportion of a hydrocarbon oil and a minor proportion of a di-(acylphenyl)-dithiophosphate. No. 2,329,436. Elmer Cook and William Thomas, Jr. to American Cyanamid Co.

Lubricating oil for severe service internal combustion engines comprising a naphthenic base mineral lubricating oil containing about 1% of an oil-soluble soap of abietic acid. No. 2,329,474. Arthur Lazar and Paul Ruedrich and Raymond Frazier to Tide Water Associated Oil Co.

Treating granulated soap to reduce the amount of soap dust by applying to at least a portion of the surfaces, only, of soap particles a normally solid water-dispersible coating agent. No. 2,329,694. John Bodman to Lever Brothers Co.

Production of lubricating oils. No. 2,329,714. Herbert Grasshof.

Aqueous well drilling mud and graphitic carbon. No. 2,329,878. Baruch Cerf to Graphite Frecs Co.

Smoker's article comprising a tobacco filler, and a paper wrapper treated in its entirety with a mixture consisting solely of an aqueous solution of borax and salt. No. 2,329,927. Joseph Morton.

Preparing a finished internal combustion engine fuel of high octane number, low acid heat and low gum content. No. 2,330,069. Edward Marshall to Standard Catalytic Co.

Sheet of compressible gasket material comprising asbestos fiber and a binder giving the fiber flow-characteristics and including petroleum oil, carbon black and bentonite. No. 2,330,106. Wilburn Bernstein and Thomas Mika to Victor Manufacturing & Gasket Co.

Treating the surfaces of refractory bodies employed as furnace liners. No. 2,330,129. Albert Lucas and William Wagner to P. B. Sillimanite Co., Ltd.

Sealing a deep well formation which comprises injecting into the formation a fluid aqueous mixture comprising sodium silicate and sulfuric acid. No. 2,330,145. Hans Reimers to The Dow Chemical Co.

Coal Tar Chemicals

Underfeed stoker fuel which comprises an intimate intermixture of between 70 and 80% by weight of bituminous coal and 20 to 30% by weight of anthracite coal of the number 4 buckwheat size. No. 2,328,147. John Hyson and Joseph Kerrick to The Philadelphia & Reading Coal & Iron Co.

Napthalene vaporizing and oxidation. No. 2,329,638. Stuart Miller to Allied Chemical & Dye Corp.

Coatings

Coating composition comprising an oil modified alkyd resin, vermiculite calcined at 600° C. to 750° C., other pigment, solvent, and drier. No. 2,328,249. Ladislaus Balassa to E. I. du Pont de Nemours & Co.

Coating composition comprising calcined natural barytes which has been heated between 1100° C. and 1300° C. for four hours. No. 2,328,250. Ladislaus Balassa to E. I. du Pont de Nemours & Co.

Coating bodies with a layer of hard carbon by deposition from a hydrocarbon gas. No. 2,328,422. Carl Christensen to Bell Telephone Laboratories, Inc

Packaging material coated with a composition comprising a cyclized rubber plasticized with para benzyl amino phenol. No. 2,328,534. Clarence Carson to Wingfoot Corp.

Preparing a grit- and gel-free pigmented nitrocellulose coating composition by selective filtration. No. 2,328,625. Carrol Doran and Clarence DeBow to E. I. du Pont de Nemours & Co.

Vinyl resin coating composition. No. 2,329,456. William Campbell, Jr. to Carbide and Carbon Chemicals Corp.

Coating composition containing manila resin. No. 2,329,663. Robert Swain and Pierrepont Adams to American Cyanamid Co.

Coating composition containing kauri resin. No. 2,329,664. Robert Swain and Pierrepont Adams to American Cyanamid Co.

Dyes, Stains

Azo dyestuff intermediate. No. 2,328,353. Neil Mackenzie to American Cyanamid Co.

Metalliferous substantive dyestuffs. No. 2,328,465. Georges Kopp.

Azo compounds and material colored therewith. No. 2,328,570. James McNally and Joseph Dickey to Eastman Kodak Co.

Dyeing organic fibrous material. No. 2,328,900. Otto Grimm and Hans Rauch to Rohm & Haas Co.

Making alkali-resisting iron blues. No. 2,329,364. Paul Thomasset to Ansbacher-Siegle Corp.

Iron blue pigment. No. 2,329,365. Paul Thomasset to Ansbacher-Siegle Corp.

Water-soluble dyestuffs of the anthraquinone series and a process for their manufacture. No. 2,329,783. Albin Peter to Sandoz A. G.

Acetate artificial silk dyestuffs. No. 2,329,798. William Tatum to Imperial Chemical Industries, Ltd.

Dyes of the class consisting of arylaminoanthraquinone sulfonic acids and their alkali metal salts. No. 2,329,809. Alexander Wuertz and David Klein to E. I. du Pont de Nemours & Co.

Equipment

Making a luminescent screen by depositing phosphor materials. No. 2,328,292. William Painter to Radio Corp. of America.

Spectrophotometer monochromator drive. No. 2,328,293. Orrin Pinco to American Cyanamid Co.

Making filter members composed of a plurality of fine glass fibers. No. 2,328,302. Allen Simison to Owens-Corning Fiberglas Corp.

Device for measuring changes of absorption of optical radiation in a reaction. No. 2,328,461. Roy Kienle, Robert Park, Charles Benbrook and Everett Grieb to American Cyanamid Co.

Electrolytic cell. No. 2,328,665. Horace Munson to The Mathieson Alkali Works, Inc.

Apparatus for determining specific gravity. No. 2,328,787. David Davidson and Milton Popowsky and Philip Rosenblatt.

Device for indicating the concentration density and dilution of liquids and solutions. No. 2,328,853. Elwin Sherrard.

Apparatus for the treatment of crude oleoresins. No. 2,328,891. McGarvey Cline to Wood Process Co., Inc.

Regenerated cellulose sponge mold consisting of an open container of acid and alkali resistant sheet metal approximately 1/16 inch thick, having a sponge mix contacting surface of sprayed stainless steel, the roughness of which is equivalent to No. 100 carborundum paper. No. 2,329,239. Thomas Banigan to E. I. du Pont de Nemours & Co.

Distilling apparatus. No. 2,329,305. Matthew Svetlick and Walter Svetlick.

Apparatus for vaporizing and superheating hydrocarbon oils. No. 2,329,341. Gilbert Dill to Herman Brassert.

Film or sheet forming device for use with organic solvent film forming solutions of high surface tension which tend to contract. No. 2,329,421. Charles Shields to E. I. du Pont de Nemours & Co.

Gas analysis method and apparatus. No. 2,329,459. Paul Dickey to Bailey Meter Co.

Recording spectrophotometer. No. 2,329,657. William Shurcliff to American Cyanamid Co.

Electric gas analyzer. No. 2,329,840. George Keinath.

Temperature measuring instrument including an A. C.-operated Wheatstone bridge, a radiation pyrometer connected into one arm of said bridge, a motor connected diagonally in relation to the bridge, and means controlled by said motor for introducing an E.M.F. in series. No. 2,329,841. George Keinath.

Catalytic reactor apparatus for obtaining contact between a stream of fluid and a mass of solid granular material. No. 2,329,847. John McCausland to Universal Oil Products Co.

Magnetic device for the purification of fluids. No. 2,329,893. Georges Girard to Magnetos Lucifer S. A.

Apparatus for measuring the water resistance of paper. No. 2,329,959. Johannes Van den Akker to The Institute of Paper Chemistry.

Water treating apparatus. No. 2,330,008. Merrill Robinson to Worthington Pump & Machinery Corp.

Apparatus for the treatment of normally gaseous hydrocarbons under elevated pressure and temperature to convert the same into liquid hydrocarbons. No. 2,330,118. Frederick Frey to Phillips Petroleum Co.

Apparatus for chemically treating the bottom beneath a body of water. No. 2,330,164. Edgar Wiedenhoefer to the State of Michigan.

Explosives

Producing improved progressive-burning surface-modified propellent smokeless powder grains. No. 2,329,575. Elton Allison and Ellsworth Goodyear to Hercules Powder Co.

Safety explosive composition comprising a major proportion of ammonium nitrate and as a sensitizer a nitroethyl nitrate derivative. No. 2,330,112. Richard Cox to Hercules Powder Co.

Food Chemicals

Production of yeast having high vitamin B_1 potency. No. 2,328,025. Morris Mead, Jr. and John Lee, one-half to Hoffman-La Roche, Inc., and one-half to National Grain Yeast Corp.

Preparing fruit juices, which comprises, subjecting the whole fruit to a 12½ to an 18½% borax water solution. No. 2,328,265. Louis Ducker and George Little to Charles Van Pelt.

Improving the animal nutritional requirements of substances of the group consisting of food products and pharmaceuticals. No. 2,328,355. Jerome Oleson to Lederle Laboratories, Inc.

Citrus product comprising an expanded mixture having intercommunicating cells of citrus fruit solids and corn syrup. No. 2,328,554. Wilbert Heyman to Granular Foods, Inc.

Chocolate composition and method of making. No. 2,328,791. Richard Drury to American Maize-Products Co.

Making soy beans palatable and readily digestible. No. 2,329,080. Charles Raymond.

Agglomeration of cereal grains. No. 2,329,402. Leland Logue to Mining Process and Patent Co.

Separating grain kernels from the outer skins of their natural formation. No. 2,329,403. Leland Logue to Mining Process & Patent Co.

Preparing a wax-like composition adapted for coating cheese which is pliable over a wide temperature range. No. 2,329,470. James Ingle and Leon Mink to Industrial Patents Corp.

In the process of storing food products, the step of freezing an aqueous glaze on the surface of the product. No. 2,329,472. Carl Koonz to Industrial Patents Corp.

Processing raw grains in the manufacture of fermented stable, chill-proof and enzymically active cereal beverage. No. 2,329,509. Harry Atwood.

Providing fruit that has a yellow rind with a substantially transparent blue-green tinted glossy protective coating of waxy material. No. 2,329,513. Charles Cothran to Brogdex Co.

Determining the maturity of corn comprising measuring the refractive index of juice of said corn. No. 2,329,936. Robert Oltman to Minnesota Valley Canning Co.

Industrial Chemicals—Inorganic

Preparing a cerium compound from a mixture of rare earth metal hydroxides. No. 2,327,992. Joseph Blumenfeld.

Treating insoluble lead compounds containing lead peroxide, the step of treating the compounds with a solution of formac acid. No. 2,328,089. John Mulligan to Lillian R. Birkenstein.
Catalyst resulting from hydrolysis of alloys of catalytic metals and hydrolyzable metals. No. 2,328,140. John Hahn to Monsanto Chemical Co.
Revivification of substantially water free decolorizing earth used in the bleaching or decolorizing of mineral oil and containing extracted coloring matter. No. 2,328,158. Edward Martin to Sinclair Refining Co.
Process for reactivating used catalysts. No. 2,328,234. Jean Delattre Seguy to Universal Oil Products Co.
Making heavy magnesium oxide. No. 2,328,286. Walter MacIntire to American Zinc, Lead & Smelting Co.
Reconditioning recovered solids of excess sprayed coating material and separating therefrom residual water introduced during its collections. No. 2,328,399. Seymour Saunders and Harry Morrison to Chrysler Corporation.
Removing of intergranular graphite from boron carbide. No. 2,328,-780 John Boyer and Carl Rose to The Carborundum Co.
Purifying hydrogen contained in a hydrogenous gas mixture with hydrocarbon gases. No. 2,328,828. Robert Marschner to Standard Oil Co.
Method for removing lime scale in heat exchangers for sulfite pulp digesters. No. 2,328,837. Albert Natwick.
Silica-alumina cracking catalyst prepared by mixing silica hydrogel with alumina hydrogel resulting from gelling an alumina sol with hydrofluoric acid and drying and igniting the mixed hydrogels. No. 2,328,846. Edgar Pitzer to Standard Oil Co.
Manufacturing animal feed from superphosphates, the step of calcining superphosphates at temperatures above 800° to substantially 1200° C. to remove sulfur originally chemically combined as sulphate in the superphosphate. No. 2,328,884. Mark Shoeld to The Davison Chemical Corp.
Separating potassium chloride from a pulp containing potassium and sodium chlorides. No. 2,329,149. Nathan Weiner to Bonneville, Ltd.
Manufacture of calcium antimonate. No. 2,329,161. Carl Harbert and Lester Bateman to The Harshaw Chemical Co.
Manufacture of catalysts. No. 2,329,307. Charles Thomas and Jacob Ahlberg to Universal Oil Products Co.
Making of microporous products. No. 2,329,322. Joseph Baty and Albert Meyer to United States Rubber Co.
Certain water-soluble high molal oxyalkylated esters and method of making same. No. 2,329,394. Melvin DeGroote and Bernhard Keiser to Petrolite Corp., Ltd.
Certain water-soluble high molal oxyalkylated esters and method of making same. No. 2,329,395. Melvin DeGroote and Bernhard Keiser to Petrolite Corp., Ltd.
Water soluble condensation product and process for making the same. No. 2,329,406. Ernst Mauersberger to Alframine Corp.
Treating soluble chemical salts, the solubility of which increases substantially at temperatures above those of their saturated solutions at their normal atmospheric boiling points. No. 2,329,505. Frederick Zimmermann to Potash Co. of America.
Design in polarizing material and method of manufacturing same. No. 2,329,543. Edwin Land to Polaroid Corp.
Method of producing sulfates. No. 2,329,641. Walter Moran and John Nelson to National Lead Co.
Catalyst comprising a colloidal solution of metal of the platinum group, a soluble vanadium compound wherein the vanadium has a valency of less than 5, and a protective colloid. No. 2,329,933. Friedrich Nord to Baker & Co., Inc.
Manufacture of cement. No. 2,329,940. Howard Ponzer to Missouri Portland Cement Co.
Purifying zinc oxide containing water soluble acid-reacting sulfur compounds. No. 2,330,050. Raymond Hallows and Vernon Walker to The Eagle-Picher Lead Co.
Purification of liquids by distillation. No. 2,330,057. Frederick Hunter to Fansteel Metallurgical Corp.
Method of reacting fluids in the presence of catalysts. No. 2,330,-068. Joseph Marancik and Lyle Cooper to Standard Oil Development Co.
Recovery of sulfuric acid from sulfuric acid sludges of mineral oils. No. 2,330,077. John O'Dell.
Preparing a hydrogenating catalyst comprising a group VI metal compound of the class consisting of tungsten and molybdenum. No. 2,330,098. Rhea Watts to Standard Catalytic Co.
Method of making chlorine. No. 2,330,114. Fredrik de Jahn to Alan Mann.
Concentration of soluble potash ores. No. 2,330,158. Francis Tartaron to Minerals Separation North American Corp.
Reactivation of a nickel-containing hydrogenation catalyst which has become deactivated and contaminated with a carbonaceous deposit. No. 2,330,174. Karl Hachmuth to Phillips Petroleum Co.

Industrial Chemicals—Organic

Acyl isothiocyanate and polymer thereof. No. 2,327,985. Van Alderman and Donald Coffman to E. I. du Pont de Nemours & Co.
Brucine salt of the acid phthalate ester of racemic alpha-hydroxy-beta, beta-methyl-gamma-butyrolactone. No. 2,328,000. Jacob Finkelstein to Merck & Co., Inc.
Derivatives of amines. No. 2,328,021. Morris Katzman and Albert Epstein to the Emulsol Corp.
Manufacturing an acetone soluble benzyl ether of dextran in two stages. No. 2,328,036. Grant Stahly and Warner Carlson to The Commonwealth Engineering Co. of Ohio.
Refining a fat-soluble vitamin-containing material. No. 2,328,053. Loran Buxton to National Oil Products Co.
Manufacture of ethers. No. 2,328,059. Wallace Craig to Richfield Oil Corporation.
Certain water-soluble high molal oxyalkylated esters and method of making same. No. 2,328,062. Melvin De Groote and Bernhard Keiser to Petrolite Corp., Ltd.
Purifying and de-odorizing carbon disulfide. No. 2,328,176. Wilhelm Sonnenschein.
Producing dextrose, or dextrose containing products, by the acid conversion of dextrose polymers. No. 2,328,191. Sidney Cantor to Corn Products Refining Co.
Light polarizer comprising a sheet of material from the class consisting of the transparent vinyl compounds, the molecules of said sheet being substantially oriented, said sheet having a dichroic substance from the class consisting of the stains and dyes incorporated therewith. No. 2,328,219. Edwin Land to Polaroid Corp.
2, 4-dioxo-3, 3-dialkyl-pyrrolidines and process for the manufacture of same. No. 2,328,232. Otto Schnider to Hoffmann-La Roche, Inc.
Molding composition comprising between about 66% and about 75% by weight based on the total acetate and plasticizer of cellulose acetate having a combined acetic acid content between 56% and 58% and between about 34% and about 25% of a plasticizing mixture. No. 2,328,269. Walter Gloor to Hercules Powder Co.
Separating ethylene from its higher homologues including propylene and butylene. No. 2,328,275. Joseph Heard, Jr. to Wyandotte Chemicals Corp.
Compound of the group consisting of amino-methylene-phosphonic acid, its N-alkyl, N-aralkyl and N-aryl derivatives, and the normal and acid salts of any of these. No. 2,328,358. Josef Pikl to E. I. du Pont de Nemours & Co.
Aliphatic 1.7-diketones disubstituted in the 4-position by a modified carboxylic acid group selected from the group consisting of ester, nitrile and amide groups and by an acidifying radicle. No. 2,328,-370. Georg Wiest.
Making lithographic plates by applying to the plate a surfacing of ammonium arabate and egg albumen. No. 2,328,371. William Wood to Harris-Seybold-Potter Co.
Producing vinyl chlorine from generator gas produced by subjecting a hydrocarbon oil to the action of electric arcs. No. 2,328,430. Ralph Dornte to General Electric Co.
N[1]-alkali metal-N[4], N[4]-dihalogen acylsulphanilamides. No. 2,328,455. Martin Hultquist and Moses Crossley to American Cyanamid Co.
Preparing a bituminous emulsion of high stability which comprises emulsifying a bitumen in water containing a sulfonation product. No. 2,328,481. Evart Mayfield to Hercules Powder Co.
Manufacture of nitrogen chloride and chloramines. No. 2,328,484. Albert Oosterhuis.
Diphenylsulphone derivative. No. 2,328,490. Paul Pohls to Winthrop Chemical Co.
Alkanol amine salts of dinitrophenols. No. 2,328,505. Frank Smith and John Hansen to The Dow Chemical Co.
Dihalo-ethylene copolymerization product. No. 2,328,510. Charles Thomas to Monsanto Chemical Co.
Manufacturing sheets of polymeric material which comprises forming a cell of two sheets of rigid material, filling the space between the two sheets with polymerizable material capable of forming a rigid polymer. No. 2,328,525. Charles Egolf to Rohm & Haas Co.
Non-halogenated starch material having high resistance to rupture of the granules on cooking in water, comprising the product of the interaction of an aqueous starch suspension and phosphorus oxychloride at a pH above 7. No. 2,328,537. George Felton and Herman Schopmeyer to American-Maize-Products Co.
Stabilizing an organic thionitrite solution against deterioration. No. 2,328,547. George Crandall, Richard George and Edwin Nygaard to Socony-Vacuum Oil Co., Inc.
Composition of matter, a physical mixture comprising 10-40 parts of reaction product of an alpha-beta-dicarboxylic acid anhydride and terpinene, 30-50 parts of a coumarone-indene cyclo-olefine resin, and 60-64 parts of a halogenated rubber. No. 2,328,566. Irving Matthews and William Lynch to Eastman Kodak Co.
Composition of matter, a physical mixture comprising 10-30 parts of a reaction product of a polybasic acid anhydride and terpinene, and 50-10 parts of a halogenated rubber from the group consisting of chlorinated rubber and brominated rubber. No. 2,328,567. Irving Matthews and William Lynch to Eastman Kodak Co.
Manufacture of 2-hydroxy carbazole. No. 2,328,588. William von Glahn and Bernard Rottschaefer to General Aniline & Film Corp.
Manufacture of mixed condensation products comprising condensing an aldehyde and a triazine. No. 2,328,593. Gustave Widmer and Willi Fisch to Ciba Products Corp.
Treatment of fatty oil the step which comprises mixing therewith about 10% or more of a petroleum wax of a melting point of at least 120° F. and heating the same to a temperature between 400° and 850° to produce by destructive distillation a fraction equal to from 10% to 80% of the original oil. No. 2,328,621. Charles Crawford.
Polyvinyl butyral sheet wrapping material softened with 3% to 10% mono-carboxylic acid di-ester of octadecanediol 1:12. No. 2,328,-646. Emmette Izard to E. I. du Pont de Nemours & Co.
Flexible, durable, regenerated cellulose pellicle, containing, as a softener an alkylene oxide polymer. No. 2,328,679. Henry Rothrock to E. I. du Pont de Nemours & Co.
Improving articles of cellulose acetate having an acetic acid content of at least 59 per cent which comprises treating the articles with aqueous acetic acid of at least 40 per cent strength as a swelling agent, treating the swollen articles with an aqueous solution of a salt selected from the class consisting of water-soluble alkali metal and alkaline earth metal salts to fix the swollen condition of the articles, drying the articles, and dyeing the dried articles. No. 2,328,682. Robert Schnegg.
Dechlorinating the polymerization products obtained in the treatment of hydrocarbons with aluminum chloride. No. 2,328,707. Carl Clar and Paul Kuhnel and Nikolaus Geiser.
Method for stabilizing organic thionitrites. No. 2,328,709. George Crandall, Richard George, and Edwin Nygaard to Socony-Vacuum Oil Co., Inc.
Method for stabilizing organic thionitrites. No. 2,328,710. George Crandall, Richard George, and Edwin Nygaard to Socony-Vacuum Oil Co., Inc

Method for stabilizing organic thionitrites. No. 2,328,711. George Crandall, Richard George, and Edwin Nygaard to Socony-Vacuum Oil Co., Inc.

Vapor phase hydrogenation of phenol and substituted phenols containing alkyl substitutes, each having not more than four carbon atoms, to produce cyclohexanols. No. 2,328,719. Augustus Houghton and Homer McNutt to Allied Chemical & Dye Corp.

Arylamides of hydroxy naphthoic acids. No. 2,328,734. Geoffrey Marriott and Kenneth Saunders to Imperial Chemical Industries, Ltd.

Removing odor of nigrosines and indulines. No. 2,328,759. Ottmar Wahl to General Aniline & Film Corp.

Converting hydrocarbon oil into substantial yields of valuable products including high antiknock gasoline. No. 2,328,773. Wayne Benedict to Universal Oil Products Co.

Producing an arylidene amine which comprises reacting an hydroxy aryl dithio acid with an aryl amine. No. 2,328,802. Albert Hardman to Wingfoot Corp.

Converting hydrocarbon gases to liquid hydrocarbons. No. 2,328,829. Percy Maschwitz and Charles Ridgway to The Pure Oil Co.

2-Cyano 1,3-butadienes having one other substituent from the group consisting of alkyl and aryl. No. 2,328,890. Albert Clifford and John Long to Wingfoot Corp.

Nitrogenous condensation product obtained by condensing together a non-aromatic amine having at least one hydrogen atom attached to the nitrogen atom thereof, an aldehyde, and a water-soluble polymeric amide. No. 2,328,901. Otto Grimm and Hans Rauch to Rohm & Haas Co.

Dyeing vinyl polymers. No. 2,328,903. Karl Heymann to American Viscose Corp

Manufacture of phenols by the vapor phase oxidation of a compound of the group consisting of benzene and toluene. No. 2,328,920. Wendell Moyer to The Solvay Process Co.

Preparing vinyl-alcohol-methacrylic ester copolymers. No. 2,328,922. Harry Neher and Edwin Kroeker to Rohm & Haas Co.

Manufacture of 2-mercapto-thiazoline. No. 2,328,929. Seaphes Shinkle to United States Rubber Co.

Producing a substantially anhydrous and salt-free sulfonated material selected from the group consisting of animal, vegetable and marine oils, fats and their respective fatty acids and fatty esters. No. 2,328,931. Karl Steik to National Oil Products Co.

Preparing alpha-amino-propionic acids. No. 2,328,940. Witty Alderson, Jr., and Paul Austin to E I. du Pont de Nemours & Co.

Diazine derivatives. No. 2,328,956. Gaetano D'Alelio and James Underwood to General Electric Co.

Reaction product of aldehydes and bis-triazinyl carbazides. No. 2,328,957 Gaetano D'Alelio and James Underwood to General Electric Co.

Triazine derivatives. No. 2,328,958. Gaetano D'Alelio and James Underwood to General Electric Co.

Triazine derivatives. No. 2,328,959. Gaetano D'Alelio and James Underwood to General Electric Co.

Diazine derivatives. No. 2,328,960. Gaetano D'Alelio and James Underwood to General Electric Co.

Triazine derivatives. No. 2,328,961. Gaetano D'Alelio and James Underwood to General Electric Co.

Reaction product of aldehydes and bis-diazinyl carbazides. No. 2,328,962. Gaetano D'Alelio and James Underwood to General Electric Co.

Reaction product of aldehydes and triazine derivatives. No. 2,328,963. Gaetano D'Alelio and James Underwood to General Electric Co.

Reaction product of aldehydes and diazine derivatives. No. 2,328,964. Gaetano D'Alelio and James Underwood to General Electric Co.

Making dihalo acrylonitriles. No. 2,328,984. Joy Lichty to Wingfoot Corp.

Plasticizer for cellulose derivatives. No. 2,329,015. Jack Thurston and John Grim to American Cyanamid Co

1-amino-6-methyl-7-chloroanthraquinone and 1-amino-6-chloro-7-methylanthraquinone. No. 2,329,023. Alexander Wuertz and Hans Gottlieb to E. I. du Pont de Nemours & Co.

Composition of matter comprising a benzene swellable co-polymer of styrene and an unsaturated ester and, as a plasticizing agent therefor, an aromatic di-ether . No. 2,329,033. Edgar Britton, Gerald Coleman, and John Zemba to The Dow Chemical Co.

Producing a flameproof product, comprising, passing sheets of fibrous material through a 10% to 15% solution of material selected from the group consisting of ammonium sulfamate and sodium sulfamate, drying the sheets to remove moisture therefrom, impregnating the sheets carrying the sulfamate compound with synthetic resin. No. 2,329,051. Frederick Hunsicker to Westinghouse Electric & Mfg. Co.

Production of phenol and its homologues from chlorobenzine and its homologues. No. 2,329,070. Wilhelm Mathes to Durez Plastics & Chemicals, Inc.

Sulfonated amides and process of producing same. No. 2,329,086. Edwin Robinson and Thomas Webber, Jr., to National Oil Products Co.

Stabilized metal sol comprising colloidal heavy metals and xanthone dyestuffs. No. 2,329,147. Paul Troch, Hermann Voss and Erich Rabald, and Henri Geigel, to Rare Chemicals, Inc.

Non-resinous, fat-soluble surface active ester of a fatty acid. No. 2,329,166. Nathaniel Tucker.

Material having a tacky surface of rubber and a protecting layer comprising smooth, flat regenerated cellulose film having a highly sized surface in contact with said tacky surface, said size consisting of a 0.15% to 0.75% sodium stearate-silicate size mixture. No. 2,329,179. Warren Beh to E. I. du Pont de Nemours & Co.

Improving the stability of a hydrocarbon distillate with respect to gum formation which comprises adding thereto a gum inhibitor together with an alkylene polyamine salt of an organic acid. No. 2,329,251. Joseph Chenicek to Universal Oil Products Co.

Recovery of a cellulose ester of a lower fatty acid and a lower fatty acid from a solution of the cellulose ester in the acid. No. 2,329,255. Henry Dreyfus and Walter Groombridge to Celanese Corp. of America.

Recovery of cellulose acetate and acetic acid from a solution of cellulose acetate in acetic acid. No. 2,329,265. Walter Groombridge and Ronald Page to Celanese Corp. of America.

Producing an unsaturated non-benzenoid hydrocarbon product having drying properties. No. 2,329,397. Edmond d'Ouville and Don Carmody to Standard Oil Co.

Delta-ketonic tetracarboxylic acid. No. 2,329,432. Herman Bruson to The Resinous Products & Chemical Co.

New compounds, tri-(beta-carboxyethyl)-acetone. No. 2,329,433. Herman Bruson to The Resinous Products & Chemical Co.

Artificial thyroprotein, comprising proteinaceous material iodinated to the extent that free iodine appears in the mixture. No. 2,329,445. Charles Turner and Ezra Reineke to American Dairies and The Quaker Oats Co.

Reaction product of a material selected from the group consisting of the monomers and polymers of acyclic terpenes having three double bonds per molecule, and hydrogen-sulfide. No. 2,329,486. Alfred Rummelsburg to Hercules Powder Co.

Preparation of pentaerythritol. No. 2,329,514. Richard Cox to Hercules Powder Co.

Processing a normally crystalline vinylidene polymer. No. 2,329,571. Ralph Wiley to The Dow Chemical Co.

Process for sweetening hydrocarbon oil in which the oil is contacted with solid alkali metal hydroxide under conditions which result in the formation of an alkali metal monosulfide. No. 2,329,615. Charles Hoover to Air Reduction Co., Inc.

Treating hydrocarbon oils by converting the mercaptans in the oil into sulfides not higher in sulfur content than disulfides. No. 2,329,616. Charles Hoover to Air Reduction Co., Inc.

mu-Substituted oxazolines, mu-substituted pentoxazolines, and methods for their preparation. No. 2,329,619. David Jayne, Jr., and Harold Day to American Cyanamid Co.

Coating the interior walls of incandescent light bulbs, vacuum tubes, and the like, with solution of the intermolecular condensation products of a lower alkyl ortho-silicate acid ester. No. 2,329,632. Charles Marsden, Jr.

Preparing a vinyl ester of a lower fatty acid. No. 2,329,644. Grafton Owens to Monsanto Chemical Co.

Aralkyl phenol produced by condensation of a nuclearly lower alkylated styrene with a phenol. No. 2,329,671. Alger Ward to The United Gas Improvement Co.

Amphoteric polyvalent metal salt of an oxyacid of phosphorus having a radical of hydrocarbon structure with more than five carbon atoms, said amphoteric polyvalent metal being selected from the group consisting of aluminum, chromium and tin. No. 2,329,707. Bruce Farrington, James Clayton and John Rutherford, to Standard Oil Co. of California.

Acetal-like derivatives of water-soluble partially alkylated celluloses. No. 2,329,741. Aubrey Broderick to Carbide and Carbon Chemicals Corp.

Decolorizing amorphous wax which normally requires excessive amounts of solid decolorizing adsorbent for complete decolorization. No. 2,329,785. John Pool to Gulf Research & Development Co.

Production of vinyl chloride. No. 2,329,795. Herbert Stanley and Thomas Philip to The Distillers Co., Ltd.

Producing high octane number hydrocarbons from relatively low octane number hydrocarbons. No. 2,329,834. Harrison Hays to Phillips Petroleum Co.

Producing alkylated aromatic hydrocarbons. No. 2,329,858. Louis Schmerling and Vladimir Ipatieff to Universal Oil Products Co.

Refining glyceride oils containing free fatty acids to separate free fatty acids from said oil. No. 2,329,889. Frederick Ewing to Refining, Inc.

Maintaining in intimate mixture with carbonaceous material during cracking thereof a control material comprising a compound or compounds selected from the group consisting of the lighter alcohols of the monohydric type, dihydric and polyhydric alcohols, aldehydes, ketones, dibasic and polybasic acids. No. 2,329,896. John Harsch to Leeds & Northrup Co.

Sweetening hydrocarbon distillates. No. 2,329,930. Howard Nebeck to Universal Oil Products Co.

Catalytically hydrogenating chemical compounds in the liquid phase comprising reacting the chemical compound with hydrogen in the presence of a catalyst comprising a colloidal solution of a metal of the platinum group and a homogeneous non-resinous synthetic organic polymer. No. 2,329,934. Friedrich Nord to Baker & Co., Inc.

1,5-dimethylhexahydronaphthalene-3,4,7,8-tetracarboxylic-3,4; 7,8-dianhydride. No. 2,329,979. Lewis Butz to Claude Wickard, Secretary of Agriculture of the U.S.A.

Preparing methylene malonic esters. No. 2,330,033. Gaetano D'Alelio to General Electric Co.

Dewaxing mineral oils including the steps of mixing the waxy oil with a dewaxing solvent, comprising an aliphatic acetate. No. 2,330,048. Luke Goodson, James Montgomery and Robert Henry to Phillips Petroleum Co.

Refining of mineral oils. No. 2,330,054. Henry Hibshman to Standard Oil Development Co.

Condensation product of polycarboxylic halides with mineral oils and process for producing it. No. 2,330,064. Eugene Lieber to Standard Oil Development Co.

Producing a stable bituminous emulsion of the oil-in-water type that readily forms a bituminous surface coating when applied to a mineral aggregate. No. 2,330,100. Harold Williams to Standard Catalytic Co.

1,10 decanolamine and method of producing it. No. 2,330,107. William Bishop to Bell Telephone Laboratories, Inc.

Molded object characterized by a nacreous sheen and consisting essentially of 100 parts of polystyrene and between about 0.5 and about 10 parts of a salt. No. 2,330,108. Russell Bradshaw to The Dow Chemical Co.

Recovering sterolic material from sterol-containing fatty material. No. 2,330,140. Elmer Obert and Albert Kleinsmith to Central Soya Co., Inc.

Production of hydroxychlorocarbonyl compounds. No. 2,330,179. Glen Morey to Commercial Solvents Corp.

Dehydrating castor oil. No. 2,330,180. Alexander Schwarcman to Spencer Kellogg & Sons, Inc.

Dehydrating castor oil which comprises dissolving in the oil a small proportion of a neutral alkyl sulfate as catalyst. No. 2,330,181. Alexander Schwarcman to Spencer Kellogg & Sons, Inc.

Leather

Preparing a mass mixture for making a leather-rubber composition. No. 2,330,084. Walter Scott.

Medicinals

Preparation of halogen substituted aminoarylsulfonic acid derivatives. No. 2,328,159. Henry Martin, Hans Zaeslin, Rudolf Hirt and Alfred Staub, to J. R. Geigy, A. G.

P,p'-diphenyl sulfone derivative of the formula $NH_2.CO.NH.C_6H_4.SO_2.C_6H_4.NH_2$. No. 2,328,548. Max Dohrn and Walter Schoeller, Otto Laubereau, Hermann Fox, Erich Lecksyck and Hans Inhoffen to Schering Corporation.

Antineuritic compound. No. 2,328,594. Robert Williams and Joseph Cline to Research Corporation.

Pyrimidine compound. No. 2,328,595. Robert Williams and Joseph Cline to Research Corporation.

Insulin nucleotidate. No. 2,328,729. Veader Leonard.

Mercuri-acetylide compound and method of preparing the same. No. 2,329,883. Morris Daskais to Research Corp.

Sterilizing medicinal pellets or the like. No. 2,329,928. Robert Mulligan to the Blue Line Chemical Co.

Metals, Alloys

Depositing ruthenium on surfaces. No. 2,328,101. Edgar Rosenblatt to Baker & Co., Inc.

Producing magnesium metal. No. 2,328,202. Henry Doerner.

Bath for coating metal prior to working the same which comprises an aqueous solution containing an alkyl phosphate salt. No. 2,328,-540. Carroll Hochwalt to Monsanto Chemical Co.

Ruthenium alloy pen point. No. 2,328,580. Milton Pickus to The Parker Pen Co.

Bonding ferrous and non-ferrous metals. No. 2,328,788. Horace Deputy.

Salt bath for salt bath furnaces, comprising the reaction product of a mixture of 17% to 60% boric acid and 40% to 83% postassium fluoride. No. 2,328,932. Johann Streicher to The American Platinum Works.

Salt bath for salt bath furnaces, comprising a reaction product of a mixture of 55% to 71% boric acid and 29% to 45% sodium fluoride. No. 2,328,933. Johann Streicher to The American Platinum Works.

Activating solution for treating metal surfaces to improve the subsequent formation of protective phosphate coatings on the metal surfaces. No. 2,329,065. John Lum and George Jernstedt to Westinghouse Electric & Mfg. Co.

Alloys, having good ductility and corrosion resistance properties, containing aluminum, iron balance substantially all manganese. No. 2,329,186. Reginald Dean and Clarence Anderson to Chicago Development Co.

Welding manganese steels. No. 2,329,410. Raymond Morrison to Morrison Railway Supply Corp.

Preparation of manganese alloys. No. 2,329,698. Reginald Dean to Chicago Development Co.

In process of metal forming the improvement comprising immersing the metal to be formed in an aqueous soap solution for a period of at least one hour prior to forming. No. 2,329,731. Samuel Spring.

Process for electrolytic refining of copper. No. 2,329,775. Karl Lindner and Hugh Shepard to American Smelting & Refining Co.

Recovering tin from tinbearing materials. No. 2,329,816. Jesse Betterton and Yurii Lebedeff to American Smelting & Refining Co.

Removing nickel from nickel-containing, predominantly non-ferrous lead bearing metals. No. 2,329,817. Jesse Betterton and Yurii Lebedeff to American Smelting & Refining Co.

Electric arc welding electrode having an austenitic steel core wire containing chromium and nickel, and a protective coating therefor, said coating containing sufficient molybdenum to produce a weld deposit containing about 1.25 to 5% of this element. No. 2,329,-986. John Goodford to Crucible Steel Co. of America.

Thermo-couple element consisting of an alloy of copper and nickel alloyed with about 0.25% to 10% by weight of aluminum. No. 2,330,018. Leland van Wert to Leeds & Northrup Co.

Treating the interior of tanks and other containers normally adapted to receive acid forming substances, for the purpose of neutralizing the acids and rendering the metal of the tank resistant to the action of rust promoting agents, which consist in releasing into the interior of the tank ammonium hydroxide. No. 2,330,051. Peter Heidt to Meyer Mathiasen.

Silver-copper solder alloy. No. 2,330,062. Joseph Lempert to Westinghouse Electric & Mfg. Co.

Casting magnesium and magnesium-base alloys in temporary molds, the improvement which comprises incorporating an aromatic ester of a phosphorus acid into the mold material. No. 2,330,111. William Caple and Richard Thrune to The Dow Chemical Co.

Recovery of magnesium from fluxes. No. 2,330,137. William Newhams to The Dow Chemical Co.

Producing volatilizable metals from alkali and alkaline earth containing materials. No. 2,330,142. Lloyd Pidgeon to Dominion Magnesium, Ltd.

Production of magnesium through sublimation by thermal reduction of magnesium containing material with ferrosilicon in metal retorts. No. 2,330,143. Lloyd Pidgeon to Dominion Magnesium, Ltd.

Surface polishing zinc, copper and their alloys, comprising subjecting the metal to electrolytic action as an anode. No. 2,330,170. Robert Manuel to Crane Co.

Paints, Pigments

Wire enamel comprising at least 25 per cent of a polyamide based on the non-volatile constituents of the enamel. No. 2,328,398. Stephen Roskosky to E. I. du Pont de Nemours & Co.

Enamel containing an air-oxidizable film-forming ingredient and a solvent mixture comprising hydrocarbon solvent and air-oxidized tetrahydronaphthalene. No. 2,328,633. Peter Evans to E. I. du Pont de Nemours & Co.

Paper, Pulp

Making safety paper which consists in uniformly incorporating in the paper a substantially colorless stain producing material being adapted to produce a conspicuous color when acted upon by ink eradicators. No. 2,329,143. Burgess Smith to The Todd Co., Inc.

Protective paper and method of making same. No. 2,329,144. Burgess Smith to The Todd Co., Inc.

Petroleum Chemicals

Manufacturing stable motor fuels of high antiknock value from olefin-containing gasoline distillates. No. 2,328,754. Charles Thomas to Universal Oil Products Co.

To convert the major portion of olefins present in gasoline into non-olefinic hydrocarbons boiling in the gasoline range, and recovering the gasoline containing the thus converted olefins. No. 2,328,756. Charles Thomas to Universal Oil Products Co.

Diesel fuel comprising a hydrocarbon fuel oil and the non-volatile oil soluble product obtained by reacting perchloromethylmercaptan with elementary sulfur. No. 2,329,489. Francis Seger and Edwin Nygaard to Socony-Vacuum Oil Co., Inc.

Conversion of olefins into aromatic liquid products with a higher number of carbon atoms. No. 2,329,672. Charles Weizmann.

Petroleum Refining

Treating natural emulsions of petroleum containing petroleum and brine. No. 2,327,996. Thompson Burnam.

Converting heavy hydrocarbon oils into gasoline. No. 2,328,103. Melvin See and James Bailie to Standard Oil Co.

Production of high anti-knock gasoline by cracking hydrocarbon oils in the presence of a finely-divided adsorptive catalyst of not more than moderate directive activity. No. 2,328,178. John Teter to Sinclair Refining Co.

Stabilizing a petroleum cut against oxidation comprising adding diphenylthiocarbazide in an amount sufficient to act as an inhibitor. No. 2,328,190. Robert Burk and Everett Hughes to The Standard Oil Co.

Separating powdered catalyst from hydrocarbon conversion products. No. 2,328,325. Robert Butikofer to Standard Oil Co.

Isomerization of olefins. No. 2,328,753. Charles Thomas to Universal Oil Products Co.

Sweetening a petroleum oil comprising treating an oil containing sulfur compounds with an alkaline solution of a lead compound. No. 2,328,760. Harry Walker to The Texas Co.

Converting predominately saturated hydrocarbons consisting of substantially C_3 and C_4 hydrocarbons to hydrocarbons boiling within a range suitable for liquid motor fuel. No. 2,328,864. John Throckmorton to The Pure Oil Co.

Breaking petroleum emulsions of the water-in-oil type, characterized by subjecting the emulsion to the action of a demulsifier comprising an amino sub-rubbery polymeric sulfur-converted polyhydric alcohol condensate ester. No. 2,329,025. Gwynne Allen to Petrolite Corp., Ltd.

Breaking petroleum emulsions of the water-in-oil type, characterized by subjecting the emulsion to the action of a demulsifier comprising an amino poly-carboxylic-acid-reacted sub-rubbery polymeric sulfur-converted polyhydric alcohol ester. No. 2,329,026. Gwynne Allen to Petrolite Corp., Ltd.

Converting petroleum and like oils. No. 2,329,658. Thomas Simpson, John Payne, and John Crowley, Jr., and Clark Teitsworth to Socony-Vacuum Oil Co., Inc.

Process for breaking petroleum emulsions. No. 2,329,699. Melvin DeGroote and Bernhard Keiser to Petrolite Corp., Ltd.

Process for breaking petroleum emulsions. No. 2,329,700. Melvin DeGroote and Bernhard Keiser to Petrolite Corp., Ltd.

Process for breaking petroleum emulsions. No. 2,329,701. Melvin DeGroote and Bernhard Keiser to Petrolite Corp., Ltd.

Process for breaking petroleum emulsions. No. 2,329,702. Melvin DeGroote and Bernhard Keiser to Petrolite Corp., Ltd.

Process for breaking petroleum emulsions. No. 2,329,703. Melvin DeGroote and Bernhard Keiser to Petrolite Corp., Ltd.

Determining suitable areas for oil exploration. No. 2,329,824. John Campbell to Ralph Fash.

Desalting crude petroleum. No. 2,329,887. Herbert Eggleston, Raymond Pierson, and James Mullin to Gilmore Oil Co.

Prospecting for subterranean petroliferous deposits. No. 2,330,026. Ludwig Blau to Standard Oil Development Co.

Isomerizing olefins by contact under isomerizing conditions with alunite. No. 2,330,071. William Mattox to Universal Oil Products Co.

Isomerizing paraffin hydrocarbons which comprises contacting at least one paraffin with aluminum chloride. No. 2,330,079. John Owen to Standard Oil Development Co.

Conversion process which comprises subjecting hydrocarbon oil to cracking treatment in a series of stages in the presence of a cracking catalyst comprising silica and alumina. No. 2,330,089. Charles Thomas and Gustav Egloff to Universal Oil Products Co.

Treating low boiling hydrocarbons boiling within the approximate range of motor fuel to increase their antiknock value. No. 2,330,-090. Charles Thomas and Herman Bloch to Universal Oil Products Co.

Catalytic isomerization of 1-olefins to 2-olefins. No. 2,330,115. Harry Drennan to Phillips Petroleum Co.

Simultaneous production of petroleum sulfonic acid bodies and a stable lubricating oil. No. 2,330,163. Pharez Waldo, Paul Goodloe, 2d, and Henry Berger to Socony-Vacuum Oil Co., Inc.

Additional patents on photographic chemicals, resins, plastics, rubber, textiles, water sewage and sanitation from the above volumes will be given next month.

Abstracts of Foreign Patents

Collected from Original Sources and Edited

Those interested in obtaining further information concerning the patents reported below should communicate with the Patent Department, CHEMICAL INDUSTRIES.

CANADIAN PATENTS

Granted and Published February 9, 1943. (Continued)

Method of separating a lower alkyl ether of cellulose from the product obtained by reacting alkali cellulose with an etherifying agent at elevated temperatures. No. 410,523. Hercules Powder Company. (Harold M. Spurlin).

Preparing a pigment comprising 3:3'-dimethyldiphenyldisulfide-4:4'-bis-azo-beta-naphthol) substantially free from mono-, tri- and polysulfides. No. 410,530. The Manchester Oxide Company, Limited. (James H. Clayton and Bernard Bann).

Package of natural cheese comprising a mass of cheese completely enclosed in a wax-rubber film surrounded by a secondary outer vented wrapper which is transparent and comparatively highly impervious to gas. No. 410,531. Marathon Paper Mills Company. (Allen Abrams and Charley L. Wagner).

Diagnostic composition in solid form comprising a mixture of ingredients reactive when placed in an aqueous liquid specimen containing reducing sugar. No. 410,533. Miles Laboratories, Inc. (Jonas Kamlet).

Method of recovering liquid hydrocarbons from a high pressure well fluid containing the same together with gaseous hydrocarbons. No. 410,538. Pan American Refining Corporation. (Chalmer G. Kirkbride).

Plastic polyvinyl alcohol composition, solid and apparently homogeneous, for forming articles. No. 410,544. Resistoflex Corporation. (Ernest Schnabel and Charles Dangelmajer).

Sheeted cellulosic material coated with a finishing varnish in which the resinous solids consist of vinyl copolymers. No. 410,548. Stoner-Mudge, Inc. (Frank R. Stoner, Jr., and Daniel McC. Gray).

Apparatus for the fractionation of a fluid mixture containing components of different volatilities. No. 410,559. The United Gas Improvement Company. (Joseph B. Claffey).

Fluorescent screen comprising a metal sulfide and another sulfur compound having a sulfur-bearing radical which acts as an inhibitor of dissociation of the metal sulfide. No. 410,563. Western Electric Company, Incorporated. (Henry Wolfson).

Process comprising reacting a compound of the following general formula: Hlg. . CH_2CH_2X . CH_2CH_2Hlg wherein X stands for oxygen or S and Hlg stands for halogen, with an arylacetonitrile in the presence of an agent capable of splitting off hydrogen halide. No. 410,567. Winthrop Chemical Company, Inc. (Otto Eisleb).

Method of successively moulding aqueous mineral coatings applied to opposite sides of a web. No. 410,572. John R. Ditmars. (William F. Grupe).

Process of recovering a stable organic derivative of cellulose from solution. No. 410,573. Camille Dreyful. (Herbert E. Martin).

Process for the production of effects on textile fabrics or other textile materials. No. 410,574. Henry Dreyfus. (James A. Wainwright and John Allan).

Method of producing vitreous enamel coated steel articles. No. 410,576. Harvey Ross Belding and John A. Eckel.

Method of making white vitreous enamel ware with coatings less in weight than 40 grams per square foot and having reflectance about 70. No. 410,578. The Titanium Alloy Manufacturing Company. (Charles J. Kinzie and Charles H. Commons, Jr.).

Dyestuff of the Naphthophenosafranine series. No. 410,579. Karl Hofchen and Eugen Herber.

Method of making crystalloidal liquid titanium salt solution of predetermined acidity factor. No. 410,632. General Chemical Company. (L'Roche G. Bousquet and Maxwell J. Brooks).

Method for hydrolytically precipitating titanium oxygen compound from hydrolyzable titanium sulfate solution. No. 410,633. General Chemical Company. (Maxwell J. Brooks).

Method of making titanium oxygen compound from halide-acetate of titanium. No. 410,634. General Chemical Company. (David W. Young).

Textile fabric containing as a finishing agent a polyhydric alcohol ester of a rosin. No. 410,637. Hercules Powder Company (Wyly McGehee Billings).

Fibrous product comprising petroleum insoluble pine wood resin dispersed therethrough in fused condition, and an asphaltic impregnating medium absorbed by the fibres. No. 410,638. Hercules Powder Company. (John H. Long).

Manufacture of acetyl-dl-alpha-tocopherol by causing acetylating agents to act on dl-alpha-tocopherol. No. 410,640. Hoffman-La-Roche, Limited. (Otto Isler).

Process for the manufacture of lower carboxylic acid esters of dl-tocopherols. No. 410,641. Hoffman-LaRoche, Limited. (Otto Isler and John A. Aeschlimann).

Process for the manufacture of lower carboxylic acid esters of dl-dimethyl tocols. No. 410,642. Hoffman-LaRoche, Limited. (Otto Isler and John A. Aeschlimann).

Method of treating sugar beet juice by lime defecation. No. 410,643. Holly Sugar Corporation. (Robert M. Daniels).

Manufacture of soluble dry products containing a concentrated coffee extract. No. 410,645. Inredeco, Inc. (Max R. Morgenthaler).

Rapid continuous process for esterifying cellulose in continuous lengths. No. 410,647. International Standard Electric Corporation. (Archibald A. New, Dudley R. Beckwith and William A. Wiltshire).

Surgical pad having a body portion of latex sponge rubber. No. 410,661. The Scholl Manufacturing Company. (William M. Scholl).

Manufacture of carbonyl compounds of the cyclopentanopolyhydrophenanthrene series. No. 410,662. Society of Chemical Industry in Basle. (Karl Miescher, Hans Gaegi and Placidus Plattner).

Manufacture of 4:5-unsaturated 3-keto-steroids by thermal decomposition of a condensation product of an organic base with a 2-halogen-3-ketone of a steroid. No. 410,663. Society of Chemical Industry in Basle. (Leopold Ruzicka).

Production of yeast by the 189 types and method for increasing the vitamin B_1 content thereof. No. 410,664. Standard Brands, Incorporated. (Alfred S. Schultz, Lawrence Atkins and Charles N. Frey).

Medium for the formation of thiamin-containing yeast. No. 410,666. Standard Brands, Incorporated. (Alfred S. Schultz, Lawrence Atkins and Charles N. Frey).

Method of forming thiamin by subjecting a substituted methyl pyrimidine to the action of yeast. No. 410,665. Standard Brands, Incorporated. Alfred S. Schultz, Lawrence Atkins and Charles N. Frey).

Yeast having good color, keeping qualities and baking strength and a thiamin content of from about 100 to 400 International units per gram dry basis. No. 410,667. Standard Brands, Incorporated. (Alfred S. Schultz, Lawrence Atkins and Charles N. Frey).

Process of precipitating an organic acid ester of cellulose from its esterification solution. No. 410,685. Camille Dreyfus. (Clifford I. Haney).

Apparatus for adding to a flowing stream of fluid proportional quantities of another fluid. No. 410,686. (James B. Kilsheimer).

Granted and Published February 16, 1943.

Printing plate formed of alloy steel containing at least 6% by weight of chromium and having printing and non-printing areas thereon. No. 410,585. Clement Batcheller.

Coloring aluminum and aluminum alloy article by immersing the article in a solution containing ferric oxalate. No. 410,608. Aluminum Company of America. (Martin Toserud).

Method of making a seal between metal wire such as tungsten wire and a vitreous material such as quartz. No. 410,622. Canadian Westinghouse Company, Limited. (Daniel S. Gustin).

Production of compounds of cellulose with formaldehyde. No. 410,625. Courtaulds, Limited. (Thomas H. Morton).

Method of clarifying solutions of titanium salts. No. 410,630. General Chemical Company. (L'Roche G. Bousquet and Maxwell J. Brooks).

Method of lowering the acidity factor of an initial crystalloidal titanium salt solution. No. 410,631. General Chemical Company. (L'Roche G Bousquet and Maxwell J. Brooks).

Granted and Published February 23, 1943.

Method for heat-treating steel in the form of wire and the like. No. 410,693. (William H. Wood and Oscar C. Trautman).

Process of making formed shapes from water dispersions of rubber. No. 410,736. Dewey and Almy Chemical Company of Canada, Limited. (Stephen B. Neilly).

Refractory construction unit having a dried but unfired waterproof and cementatory adhering coating which includes a water insoluble base. No. 410,748. E. J. Lavino and Company. (Gilbert E. Seil).

Method of removing and recovering the water-soluble materials resulting from the heat treatment under pressure of ligno-cellulose material. No. 410,750. Masonite Corporation. (Robert M. Boehm).

Method of preparing a formaldehyde-urea composition for molding including a mold lubricating agent. No. 410,754. Plaskon Company, Incorporated. (Maurice H. Bigelow).

Method of producing an intermediate reaction product capable of conversion by heat into an infusible resin. No. 410,755. Plaskon Company, Incorporated. (John K. Simons).

Trademarks of the Month

A Checklist of Chemical and Chemical Specialties Trademarks

403,435. Bessire & Co., Inc., Indianapolis, Ind.; filed July 22, 1942; serial No. 454,399; for sulfuric acid; since Jan. 6, 1942.
403,582. Sandpaper, Inc., Waltham, Mass.; filed July 16, 1943; serial No. 462,124; for coated abrasives, since June 16, 1941.
453,548. Kelco Co., San Diego, Calif.; filed June 15, '42; paints; since June 1, '42.
453,680. New Wrinkle, Inc., Dayton, O.; filed June 15, 1942; for paints; since June 1, 1942.
454,018. Selmer Projectiles, Ltd., as Selmer (Chemical) Co., London; filed July 2, 1942; fire extinguishers since Mar. 24, 1941.
456,506. Felton Chemical Co., Inc., Brooklyn, N. Y.; filed Oct. 29, 1942; for essential oils; since April 30, 1942.
456,600. Glascote Products, Inc., Cleveland, O.; filed Nov. 2, 1942; for chemical equipment; since Dec., 1919.
457,878. Masury-Yound Co., Charlestown, Mass.; filed Jan. 12, 1943; for floor sealing compound; since Sept. 27, 1940.
458,850. Southport Paint Co., Inc., Savannah, Ga.; filed March 1, 1943; for waterproofing compound; since March, 1920.
459,564. Thos. H. Gibson, as Tex Products Co., Newark, N. J.; filed April 1, 1943; since March 10, 1943.
459,777. Automatic Products Co., Milwaukee, Wisc.; filed April 10, 1943; for filters, since March 31, 1943.
459,781. Catalin Corp., N. Y.; filed April 10, 1943; for resins since March 31, 1943.
459,788. Carl E. Heil as Heil Engineering Co., Cleveland, O.; filed April 10, 1943; for chemical resistant; since Aug. 20, 1942.
460,033. Pennex Products Co., Pittsburgh, Pa.; filed April 20, 1943; for cleaning compounds; since 1928.
460,211. Gamble Stores, Inc., Minneapolis, Minn.; filed April 27, 1943; paints; since April 1, '43.
460,877. Taylor Paisley, as The Korex Co., Ferndale, Mich.; filed May 24, 1943; for cleaning compound; since Dec. 15, 1942.
460,940. Murray L. Schuster, as United Sanitary Chemicals Co., Baltimore, Md.; filed May 26, 1943.
461,128. American Oil and Disinfectant Corp., N. Y.; filed June 4, 1943; for chemical cleaning compound; since Sept. 15, 1941.
461,174. Kreuter-Faasen Co., Grand Rapids, Mich.; filed June 5, 1943; for ready-mixed paints; since February, 1940.
461,348. Infilco Inco., Chicago, Ill.; filed June 12, 1943; for boron removing or absorbing material; since March 5, 1943.
461,545. Club Aluminum Products Co., Chicago, Ill.; filed June 21, 1943; for general cleaner;; since Mar. 3, 1943.
461,557. Golden Glint Co., Seattle, Wash.; filed June 21, 1943; wax; since Feb. 25, 1943.
461,620. Wallerstein Co., Inc., N. Y.; filed June 23, 1943; for enzymatic material; since May 20, 1943.
461,659. The Johnson-March Corp., N. Y.; filed June 25, 1943; for dustproofing coal; since June 7, 1943.
461,751. Stix, Baer and Fuller Company, St. Louis, Mo.; filed June 28, 1943; for bouquet soap; since August 30, 1941.
461,770. Pettingell & Fenton, Inc., N. Y.; filed June 30, 1943; for removing shine from fabrics; since March 15, 1943.
461,838. Arkansas Co., Inc., Newark, N. J.; filed July 3, 1943; for textile emulsifying agent; since April, 1937.
461,882. Turco Products, Inc., Los Angeles, Calif.; filed July 5, 1943; since March 1, 1943.
461,886. Berry Bros., Detroit, Mich.; filed July 6, 1943; for paints; since Feb., '40.
461,904. Hill-Ric Corp., N. Y.; filed July 7, 1943; for insecticide; since April 1, 1943.
461,917. American Cyanamid Co., N. Y.; filed July 8, '43; repellant; since June 2, '42.
462,017. Huriklene Chemical Co., Bennington, Vt.; filed July 12, 1943; for liquid cleaner; since June 23, 1943.
462,059. Standard Oil Co., of N. J., Wilmington, Del.; filed July 13, 1943; for waterproofing articles; since March 22, 1943.
462,062. Wallerstein Co., Inc., N. Y.; filed July 13, 1943; for enzymatic preparation; since November 9, 1940.
462,112. Essential Products Co., Inc., Williamsburgh, Mo.; filed July 16, 1943; for ready-mixed paint; since October 21, 1942.
462,175. Arkansas Co., Inc., Newark, N. J.; filed July 20, 1943; for textile protective agents; since February, 1941.
462,227. J. M. Huber, Inc., N. Y.; filed July 22, 1943; plastic agent, since July 6, '43.
462,232. Pontiac Refining Corp., Corpus Christi, Tex.; filed July 22, 1943; for petroleum products; since February 1, 1943.
462,260. Waddy T. Mathis, Hamden, Conn.; filed July 23, 1943; for inks for marking glassware; since November 13, 1938.
462,316. Kelco Co., San Diego, Calif.; filed July 26, 1943; for algin product for water paints; since December 22, 1936.
462,359. California Spray-Chemical Corp., Wilmington, Del.; filed July 28, 1943; for parasiticides; since May 24, 1940.
462,362. Davidson Mfg. Corp., Chicago, Ill.; filed July 28, 1943; for making a lithographic plates since November, 1940.
462,408. Becker-Bischoff Chemical Co., St. Louis, Mo.; filed July 31, 1943; for insect repellent; since June 26, 1941.
462,465. Turco Products, Inc., Los Angeles, Calif.; filed August 2, 1943; for detergent preparations; since May 1, 1943.
462,467. Wishnick-Tumpeer, Inc., Chicago, Ill.; filed August 2, 1943; for barium-calcium extender; since May, 1941.
462,524. R. R. Street & Co., Chicago, Ill.; filed August 4, '43; strippers since 1922.
462,535. The Brunswich-Balke-Collender Co., Chicago, Ill.; filed August 5, 1943; for germicidal deodorant; since May 12, 1942.
462,555. Geigy Co., Inc., N. Y.; filed August 6, 1943; for insecticides; since July 12, 1943.
462,609. Abbott Labs., North Chicago, Ill.; filed August 9, 1943; for bacteristatic sulfone compound; since July 30, 1943.
462,727. United Gilsonite Labs., Scranton, Pa.; filed August 13, 1943; for roof paints; since February 17, 1943.

† Trademarks reproduced and described include those appearing in *Official Gazette of U. S. Patent Office*, Sept. 21 to Oct. 12, 1943.

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